

# A REVIEW OF THE GENUS *NEOBYTHITES* (PISCES, OPHIDIIDAE) IN THE ATLANTIC, WITH THREE NEW SPECIES

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## ABSTRACT

A review of West Atlantic *Neobythites* material (812 specimens) has shown the existence of eight species: *N. gilli* Goode and Bean, 1885; *N. marginatus* Goode and Bean, 1886; *N. ocellatus* Günther, 1887; *N. elongatus* Nielsen and Retzer, 1994; *N. unicolor* Nielsen and Retzer, 1994; *N. brasiliensis* n. sp.; *N. monocellatus* n. sp.; *N. multidigitatus* n. sp. The main diagnostic characters are number of preopercular spines, presence or absence of ocelli in dorsal fin and vertical and horizontal dark lines on dorsal fin or body, number of pectoral finrays and length of ventral fins. Previous authors have synonymized *N. gilli* and *N. ocellatus* but it is shown that they are clearly two species.

The genus *Neobythites* Goode and Bean, 1885 as defined by Cohen and Nielsen (1978: 36) is known from all oceans. It is rich in species with a total of 33 recognized, including the three herein described. In addition, there are at least ten species still to be described from the eastern Indian Ocean and the West Pacific.

In the Atlantic Ocean *Neobythites* is found in the western part from off Pernambuco to off North Carolina (9°S–36°N). Additionally, one specimen of *N. analis* Barnard, 1927 has been caught off Cape Town (Nielsen, 1995:3). This species has its main distribution off Southeast Africa, however, and will consequently not be considered here.

This paper is one of a series describing the *Neobythites* species from various geographical areas, i.e., Nielsen and Quéro, 1991; Nielsen and Uiblein, 1993; Nielsen and Retzer, 1994; Nielsen, 1995 and 1997. Remaining areas to be treated are the eastern Indian and Pacific Oceans.

## MATERIAL AND METHODS

A total of 812 *Neobythites* specimens from the western Atlantic have been examined. The main sources were the collections in MCZ, UF, and USNM but smaller collections from BMNH, FMNH, TCWC, and ZMUC were also included (museum abbreviations follow Leviton et al., 1985). The bulk of the material was collected by the RV OREGON and other vessels from the U. S. Bureau of Commercial fisheries in the 1950s and 1960s and consequently many specimens have lost their color patterns. In some cases this may make a species identification difficult. From 1950 to 1965 the research vessels OREGON, SILVER BAY, COMBAT, and PELICAN made about 14,000 stations in the West Indies area, indicating an enormous fishing-effort.

Measurements were taken as specified by Hubbs and Lagler (1958) with the following exceptions: Head length is measured from upper jaw symphysis to hind margin of opercle. Eye diameter is the horizontal diameter of the eye window. Gill raker counts include rakers from both upper and lower branch of anterior arch. Longest gill filaments are measured on anterior arch. In vertebral counts the ural elements are counted as "1". The measurement "snout-ocellus" is made from the upper jaw symphysis to the anterior part of the dark spot in the ocellus. Most specimens are bleached so that the white ring surrounding the black spot in the ocellus has disappeared and only the black spot or blotch remain. Lengths are given as standard length (SL). When the sex is not indicated in "Material Examined" the specimen could not be sexed or have not been opened. On the "Maps of distribution" a number within a symbol indicates several neighboring stations.

For some of the more common species not all meristic and morphometric characters were counted and measured for all specimens. In the tables a number following "[" indicates the number of specimens examined.

Almost the entire material was caught in bottom trawls, with a few from dredges and other gear working at the bottom. None of the collecting gear were provided with a closing devise so pelagic catches cannot be excluded. However, considering the huge number of pelagic hauls carried out in the West Indies lacking any specimens belonging to *Neobythites* it seems safe to state that the genus lives on or very close to the bottom (benthopelagic).

**DISPERSAL.**—When the remaining *Neobythites* species have been described a cladistic analysis might show from where the present species derive. However, judging from the fact that (1) *Neobythites* is unknown from the eastern Atlantic in spite of intensive trawling on the upper slope (2) otoliths of *N. ocellatus* from early Miocene are found in Trinidad and the Dominican Republic (3) the East Pacific and the West Indies in this period were connected by a broad sound—it seems justifiable to assume that the West Atlantic species have entered the area via the Eastern Pacific.

## SYSTEMATICS

### *Neobythites* Goode and Bean, 1885

*Neobythites* Goode and Bean, 1885:600 (type species *N. gilli* Goode and Bean, 1885 by monotypy).

**Diagnosis.**—Body short, mouth subterminal, upper jaw ends posterior to eye, large eye about equal to snout, opercular spine strong, 0–3 spines on hind margin of preopercle, two median basibranchial tooth patches, anterior gill arch with 6–20 long rakers, pectoral fin entire, two rays in each ventral fin.

**Species.**—As previously mentioned, *Neobythites* is rich in species but with only a few exceptions each species has a rather restricted geographical distribution. The western Atlantic species are so isolated from the Indo-Pacific ones that it seems unlikely that the same species would be found in both areas. This is supported by the 12 *Neobythites* species known from the western Indian Ocean and others from the eastern Indian Ocean and from the Pacific Ocean (Nielsen, 1995 and MS) all of which differ from the West Indian species.

Besides the species now referred to *Neobythites* the following Atlantic species of other genera were originally assigned to this genus:

- N. brucei* Dollo, 1906 now *Holcomycteronus brucei*
- N. crassus* Vaillant, 1888 now *Spectrunculus grandis*
- N. grandis* Günther, 1877 now *Spectrunculus grandis*
- N. phyllosoma* Parr, 1933 now *Pycnocraspedum phyllosoma*
- N. robustus* Goode and Bean, 1886 now *Benthocometes robustus*

Table 1 shows the frequency distribution for eight diagnostic characters of the West Atlantic species:

### KEY TO THE *NEOBYTHITES* SPECIES FROM THE WEST ATLANTIC, BASED ON UNFADED MATERIAL

1a. Preopercular spines 0–1 .....	2
1b. Preopercular spines 2 .....	5
2a. No ocelli in dorsal fin, preopercular spine strong .....	<i>unicolor</i>
2b. Dorsal fin with 1–6 ocelli, preopercular spine absent or broad and thin .....	3
3a. Dorsal fin with one ocellus .....	<i>monocellatus</i>

3b. Dorsal fin with 2–6 ocelli .....	4
4a. Dorsal fin with 2 (rarely 3–4) ocelli, body and jaws dark-brown .....	<i>gilli</i>
4b. Dorsal fin with 4 (rarely 5–6) ocelli, body and jaws light-brown .....	<i>ocellatus</i>
5a. Dorsal fin without dark markings .....	6
5b. Dorsal fin with ocelli or a horizontal stripe .....	7
6a. Two broad spines on preoperculum, pectorals with 32 rays .....	<i>multidigitatus</i>
6b. Two strong, pointed spines on preoperculum, pectorals with 23–26 ray .....	<i>elongatus</i>
7a. Dorsal fin and body with horizontal, dark band .....	<i>marginatus</i>
7b. Body with 5–7 diffuse, dark brown, vertical bands ending in black spots on dorsal and anal fins .....	<i>braziliensis</i>

KEY TO THE *NEOBYTHITES* SPECIES FROM THE WEST ATLANTIC, BASED ON FADED MATERIAL

1a. Preopercular spines 0–1 .....	2
1b. Preopercular spines 2 .....	4
2a. Preopercular spine solid and sharp .....	<i>unicolor</i>
2b. Preopercular spine absent or thin and broad .....	3
3a. Number of rays in dorsal fin 88–97 and anal fin 73–81, vertebrae 52–56 .....	<i>gilli</i>
3b. Number of rays in dorsal fin 93–101 and anal fin 78–85, vertebrae 54–59 .....	<i>monocellatus/ocellatus</i>
4a. Number of rays in dorsal fin 112–116 and anal fin 95–98, length of ventral fin 9.5–11.5% SL .....	<i>braziliensis</i>
4b. Number of rays in dorsal fin 101–113 and anal fin 84–97, length of ventral fin 12.0–16.5% SL .....	5
5a. Number of rays in dorsal fin 101–105, anal fin 86–90 and pectoral fin 23–26 .....	<i>elongatus</i>
5b. Number of rays in dorsal fin 103–113, anal fin 89–97 and pectoral fin 24–32 .....	6
6a. The two preopercular spines broad, 32 pectoral rays .....	<i>multidigitatus</i>
6b. The two preopercular spines narrow and pointed, 24–28 pectoral rays .....	<i>marginatus</i>

*Neobythites gilli* Goode and Bean, 1885

(Figs. 1–4)

*Neobythites gilli* Goode and Bean, 1885:601 (type locality 28°36'N, 85°33'W).*Neobythites gilli*: all specimens published under this name caught outside the Gulf of Mexico are incorrectly identified; the great majority belongs to *ocellatus* Günther, 1887 but also *monocellatus* (here described) is represented (Arai, 1983: 234).

*Material examined*.—(178 specimens, 26–144 mm SL): HOLOTYPE: ♀, SL 80, Gulf of Mexico, 28°36'N, 85°33'W, RV ALBATROSS Sta. 2402, 203 m, 1885, USNM 37340. NON-TYPE MATERIAL: 2 ♀, SL 72–81, same data as for holotype, USNM 37340. — 1, SL 62, off Louisiana, 29°13'N, 88°46.5'W, RV PELICAN Sta. 72-5, 73 m, 23 May 1938, USNM 155660. — 2, SL 95–117, Gulf of Mexico, 29°47'N, 86°58'W, RV OREGON Sta. 27, 192 m, 14 June 1950, USNM 159188. — 1, SL 120, off Louisiana, 29°12'N, 88°26'W, RV OREGON Sta. 2799, 143 m, 29 May 1960, USNM 309226. — 3, SL 73–80, off Louisiana, 29°13.5'N, 88°13'W, RV OREGON Sta. 2803, 124 m, 1 June 1960, UF 207131. — ♂ and 2 ♀, SL 108–124, off Louisiana, 29°7'N, 88°14'W, RV OREGON Sta. 3646, 229 m, 14 June 1962, USNM 309233 (2, SL 122–124) and BMNH 1972.110.24:5. — 10 ♀, SL 91–127, off Louisiana, 29°12'N, 88°16'W, RV OREGON Sta. 4001, 183 m, 23 Oct. 1962, USNM 307225. — ♂, SL 122, off Mississippi, 29°11'N, 88°28'W, RV Gus III Sta. X5, 183 m, Jan. 1964, TCWC 2139.1. — ♂ and 2 ♀, SL 98–109, Gulf of Mexico, 29°42'N, 86°45'W, RV OREGON Sta. 4943, 183 m, 14 June 1964, USNM 309224. — 20, SL 60–110, off Florida, 28°40'N, 85°30'W, RV TURSIOPS Sta. 7018-08, 186 m, 3 Oct. 1970, UF 71392(18, SL 60–110) and ZMUC P771201-1202 (2, SL 70–96). — 2 ♂, SL 100–139, off Florida, 29°37'N, 86°35'W, RV TURSIOPS Sta. 7019-05, 189 m, 10 Oct.

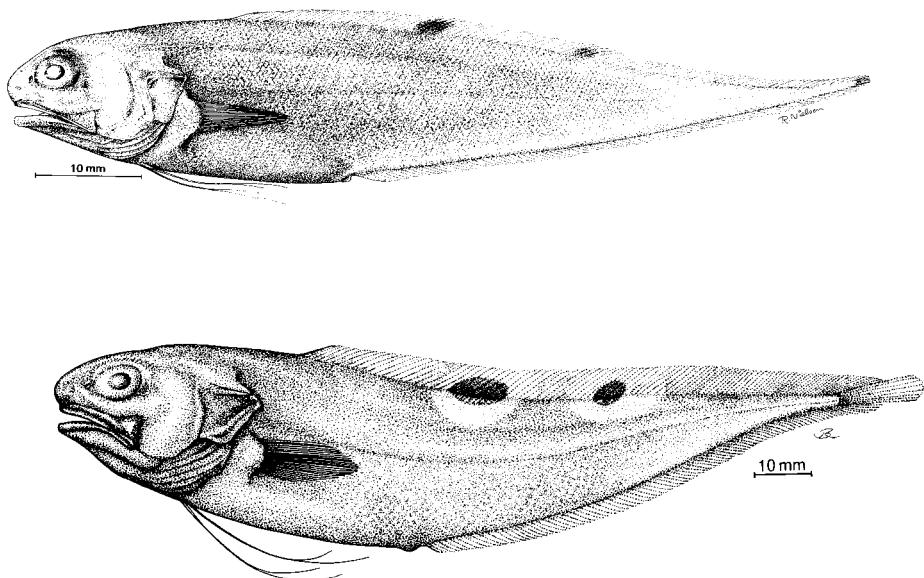


Figure 1. *Neobythites gilli*. a) Holotype, USNM 37340, SL 80; b) UF 81491, SL 138 (caught 102 years later than holotype).

1970, UF 71397. — 3, SL 81–111, off Alabama, 29°17'N, 87°55'W, RV TURSIOPS Sta. 7019-08, 184 m, 11 Oct. 1970, UF 72140. — 9, SL 35–100, off Alabama, 29°12'N, 88°16'W, RV TURSIOPS Sta. 7019-09, 183 m, 11 Oct. 1970, UF 71400 (7, SL 35–100) and ZMUC P771202-1204 (2, SL 83–92). — ♂, 3 ♀ and 13?, SL 65–135, off Florida, 29°57'N, 86°55'W, RV TURSIOPS Sta. 7019-27, 144 m, 15 Oct. 1970, UF 71402. — 6, SL 68–108, off Louisiana, 29°13'N, 88°16'W, RV TURSIOPS Sta. 7102-07, 185 m, 21 Jan. 1971, UF 71444. — ♀ and 1?, SL 55–80, off Florida, 29°37'N, 86°36'W, RV TURSIOPS Sta. 7102-14, 183 m, 24 Jan. 1971, UF 71455. — 7, SL 27–42, off Florida, 29°33.5'N, 86°15'W, RV TURSIOPS Sta. 7102-19, 119 m, 25 Jan. 1971, UF 72189. — 3, SL 45–61, off Florida, 29°20'N, 87°43'W, RV TURSIOPS Sta. 7110-08, 183 m, 9 Apr. 1971, UF 72214. — 7, SL 49–108, off Florida, 29°53'N, 86°44'W. RV TURSIOPS Sta. 7110-13, 137 m, 10 Apr. 1971, UF 72238. — 2, SL

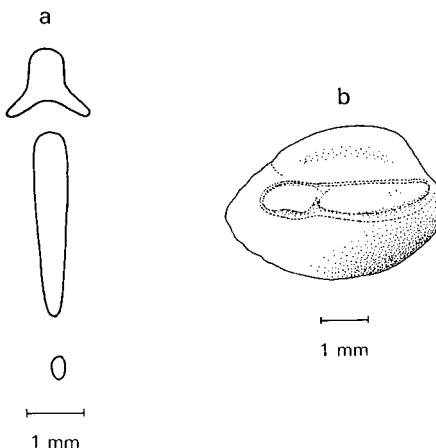


Figure 2. *Neobythites gilli*. a) Vomer and basibranchial tooth patches of holotype; b) Left sagitta of holotype.

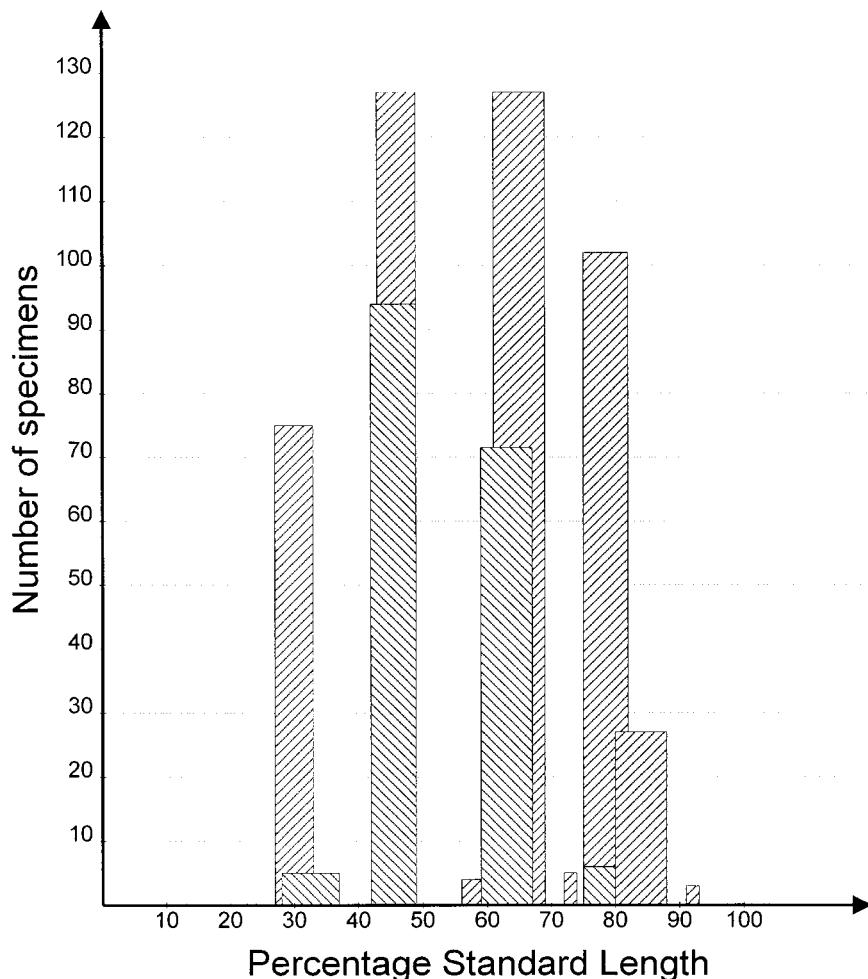


Figure 3. Each block of the histogram shows the proportional location of the individual ocelli along the length of the specimens of the two species. *Neobythites gilli* (\\) and *N. ocellatus* (//).

69-95, off Florida, 28°40'N, 85°30'W, RV TURSIOPS Sta. 7115-06, 183 m, 19 May 1971, UF 72264. — 1, SL 115+, off Texas, 26°46'N, 96°26'W, 71A7-18, 229 m, 16 July 1971, TCWC 6314.15. — 1, SL 28, off Florida, 29°33'N, 86°13'W, RV TURSIOPS Sta. 7120-13, 107 m, 19 July 1971, UF 72296. — ♂ and 2?, SL 62-88, off Florida, 29°26'N, 86°20'W, RV TURSIOPS Sta. 7120-14, 175 m, 20 July 1971, UF 71500. — 2, SL 74-75, off Florida, 29°40'N, 86°42'W, RV TURSIOPS Sta. 7120-31, 195 m, 20 July, 1971, UF 71503. — 2, SL 26-30, off Florida, 29°55'N, 86°41'W, RV TURSIOPS Sta. 7120-32, 125 m, 20 July 1971, UF 72305. — 3 ♂, SL 121-130, off Louisiana, 27°52'N, 92°55'W, 71A7-34, 192 m, 20 July 1971, TCWC 6317.9. — 4, SL 64-115, off Florida, 29°22'N, 86°13'W, RV TURSIOPS Sta. 7127-01, 183 m, 16 Oct. 1971, UF 71531. — 4, SL 87-142, off Florida, 29°34'N, 86°35'W, RV TURSIOPS Sta. 7127-09, 205 m, 16 Oct. 1971, UF 71535 (3, SL 87-142) and ZMUC P771205(1, SL 108). — 4, SL 75-120, off Alabama, 29°14'N, 88°00'W, RV TURSIOPS Sta. 7127-16, 183 m, 18 Oct. 1971, UF 71540. — 7, SL 47-93, off Louisiana, 29°7'N, 88°40'W, RV TURSIOPS Sta. 7127-26, 93 m, 19 Oct. 1971, UF 71555. — 2 ♀ and 9?, SL 42-90, Campeche Bay, 18°50.4'N,

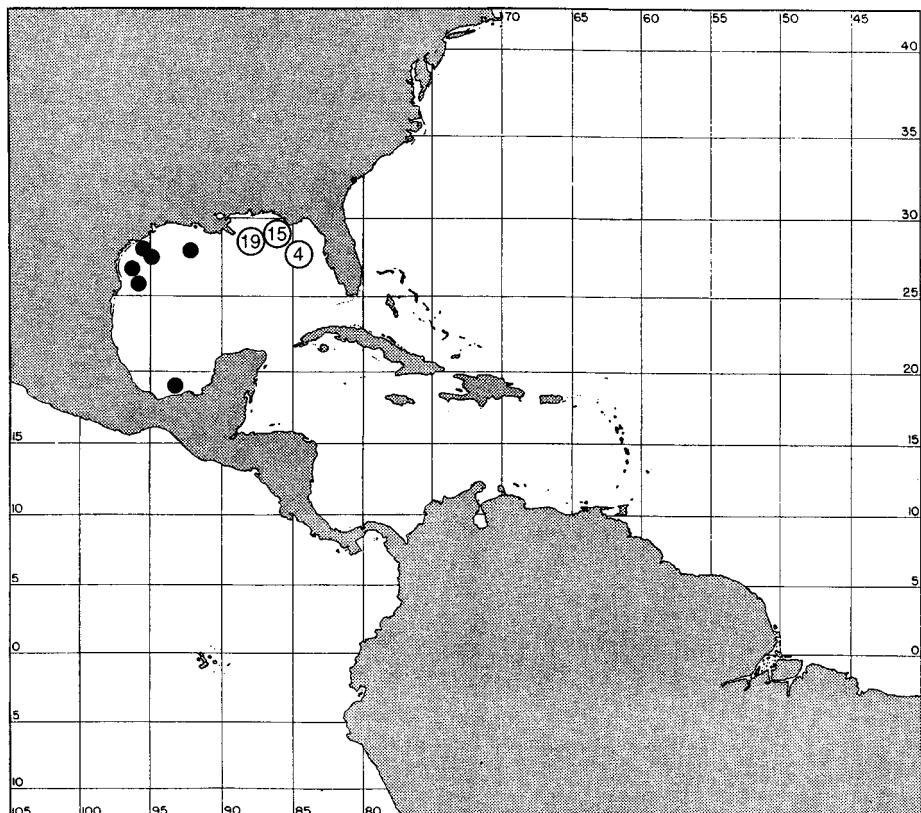


Figure 4. Records of *Neobythites gilli* — the numbers indicate the number of neighbouring stations.

93°35.2'W, MBI 60, 140–153 m, 12 Nov. 1975, TCWC 4468.2. — ♀ and 2?, SL 58–65, off Texas, 27°52.4'N, 95°14.7'W, MBI 240, 112–116 m, 22 Apr. 1976, TCWC 6603.1. — ♂, SL 108, off Texas, 26°00'N, 96°20.5'W, MBI 870, 184 m, 3 Aug. 1977, TCWC 6673.3. — 2, SL 40–63, off Texas, 27°57.2'N, 95°16.2'W, Sta. 30, 82 m, 2 June 1981, TCWC 3331.01. — 1, SL 97, off Louisiana, 29°12.5'N, 88°25.2'W, RV OREGON Sta. OLL 42596, 165 m, 3 Apr. 1985, UF 44361. — ♀, SL 138, off Florida, 29°30.7'N, 86°24.6'W, OLL 44901, 170 m, 11 Jan. 1987, UF 81491. — 3, SL 95–106, off Florida, 28°31.7'N, 84°52.3'W, OLL 44927, 59 m, 13 Jan. 1987, UF 81385. — ♂ and 3 ♀, SL 112–139, off Mississippi, 28°59'N, 88°53.4'W, 87-B2-C-4, 172 m, 11 Mar. 1988, TCWC 6831.08. — ♂, 3 ♀ and 5?, SL 59–122, off Alabama, 29°15.2'N, 88°7'W, 87-B2-M-4, 162 m, 11 Mar. 1988, TCWC 6839.13. — ♀, SL 144, off Mississippi, 29°15.1'N, 88°7.7'W, 87—B2-M-4, 200 m, 11 Mar. 1988, TCWC 6839.42. — 2 ♂ and 3 ♀, SL 95–115, off Alabama, 29°40'N, 87°16.7'W, 87-B2-D-4, 201 m, 16 Mar. 1988, TCWC 6835.11. — 1, SL 78, off Dry Tortugas, 101 m, USNM 116866.

*Remarks to material.*—In all, 178 specimens are referred to *N. gilli* of which 173 specimens (SL underlined in the “Material examined”) were more or less examined in detail and form the basis of Tables 1, 2 and 3.

*Diagnosis.*—*N. gilli* differs from all other Atlantic *Neobythites* spp. by the following combination of characters: 1–4 (most often 1–2) ocelli in dorsal fin, 0–1 (mostly weak)

spine on hind margin of preopercle, total vertebrae 52–56, dorsal finrays 88–97 and anal finrays 73–81.

**Similarity.**—The only other Atlantic *Neobythites* sp. with more than one ocellus in the dorsal fin is *N. ocellatus*. Figure 3 shows that *gilli* usually has only two while *ocellatus* normally has four ocelli. Also, *gilli* has fewer rays in the dorsal (88–95 vs 96–101) and anal fins (73–80 vs 80–85) and generally, *gilli* is more pigmented than *ocellatus*.

**Description.**—The principal meristic and morphometric characters are given in Tables 1, 2 and 3.

Snout rather blunt, about equal in length to eye window. Maxilla ends well behind eye. Teeth small and granular in jaws, larger on palatines and subtriangular vomer; anterior basibranchial tooth patch getting more narrow posteriorad, posterior small and oval (Fig. 2A). Anterior nostril with a skin-flap or tube, posterior nostril a simple hole. Mandibular canal with four pores, the anterior close to lower jaw symphysis. A few fringes on snout, no papillae on lower lip. Spine on hind margin of preoperculum rather weak or absent, broad in smaller specimens. Opercular spine strong and straight. Head and body with small, cycloid scales. Lateral line indistinct. Ventral fins reach about 2/3 of the distance to anal fin. Anterior gill arch with 1–3 small knobs and 3–4 long rakers on upper branch, one long raker in the angle, and lower branch with 8–10 long rakers and 3–5 small knobs. Length of gill rakers and filaments vary rather much without showing allometric growth.

Sagittal otolith (Fig. 2B) is rather thick and almost circular with a pointed posterior rim; the sulcus is distinct with a clear separation of cauda and ostium; ostium almost twice as long as cauda ending close to anterior rim; no osteal channel.

**AXIAL SKELETON (FROM RADIOGRAPHS).**—Tips of all neural and haemal spines thin and pointed; vertebrae 3–8 with depressed neural spines slightly shorter than spine on 2nd vertebra; base of neural spines 3–10 enlarged; parapophyses on the posterior six precaudal vertebrae; pleural ribs on the posterior 3–12 precaudal vertebrae and epipleural ribs on nos. 4–10.

**COLORATION.**—The illustration of the holotype (Fig. 1A) was made 110 yrs after its capture, the specimen still showing two ocelli or remains of ocelli. Figure 1B is based on a specimen caught 10 yrs ago showing two typical ocelli with a distinct, light, outer ring. All scales faintly pigmented. Head and ventral part of body brownish and with numerous, minute, black spots. Eye and peritoneum dark blue, area surrounding anus black, lips dark brown and mouth- and branchial cavities brown.

**OCELLI.**—Figure 3 and Table 3 shows the number and position of ocelli on the dorsal fin. Ocelli were not observed on the anal fin. Of the 173 specimens examined 40 had one ocellus, 109 had two ocelli, 12 had three ocelli and three had four ocelli. Nine specimens were so bleached that the number of ocelli was uncertain. Four small specimens (SL 28–58) had four distinct plus a number of less distinct ocelli. The second ocellus, the one placed near the midpoint of the fish, is always the largest.

**Biology.**—*N. gilli* is the most shallow occurring of the West Indian *Neobythites* spp. as it is hardly found deeper than the continental shelf (59–229 m depth). Based on radiographs there were no mollusks or fish bones in the stomachs or intestines in any of the 178 specimens examined; only remains of unidentifiable crustaceans were found. The gonads of about 100 specimens were examined showing eight males, 41 females and about 50 specimens with very unripe gonads. Two of the females (SL 100 and 139) were ripe. The deficit of males may be due to the fact that an unripe male is more difficult to recognize than an unripe female.

Table 1. Frequency distribution for 8 characters of *Neobrythites* spp.

	Number of dorsal finrays									
	88	90	91	94	95	98	100	105	110	115
<i>N. gilli</i>	1	1	13	11	41	25	23	8	1	1
<i>N. ocellatus</i>										
<i>N. monocellatus</i>				3	2	10	21	15	9	5
<i>N. unicolor</i>						3	6	4	7	3
<i>N. marginatus</i>								3	5	2
<i>N. elongatus</i>							3	5	3	1
<i>N. brasiliensis</i>								1	3	8
<i>N. multidigitatus</i>									2	1
									1	1

	Number of anal finrays								
	73	75	76	80	85	90	95	98	
<i>N. gilli</i>	2	6	23	28	32	26	6	9	1
<i>N. ocellatus</i>						1	17	19	10
<i>N. onocellatus</i>				5	12	21	14	14	3
<i>N. unicolor</i>					2	4	7	3	2
<i>N. marginatus</i>						3	5	7	1
<i>N. elongatus</i>							2	1	4
<i>N. brasiliensis</i>							5	5	4
<i>N. multidigitatus</i>								1	2
								1	2

	Number of pectoral finrays									
	23	24	25	26	27	28	29	30	31	32
<i>N. gilli</i>	10	20		18						
<i>N. ocellatus</i>	1	7	11	13	3	2				
<i>N. monocellatus</i>		4	16	21	10					
<i>N. unicolor</i>				3	15	5	3			
<i>N. marginatus</i>		2	5	13	7	2				
<i>N. elongatus</i>	4	6	5	2						
<i>N. brasiliensis</i>							3	4		
<i>N. multidigitatus</i>										1

Table 1. Continued.

	Number of precaudal vertebrae					Number of total vertebrae (including ural elements)	60	61	62	63	64	65	66
	11	12	13	14	15								
<i>N. gilli</i>	5	146	1										
<i>N. ocellatus</i>		67	2										
<i>N. monocellatus</i>		69	2										
<i>N. unicolor</i>	29												
<i>N. marginatus</i>	31		6										
<i>N. elongatus</i>	17												
<i>N. brasiliensis</i>		7											
<i>N. multidigitatus</i>				1									
<i>N. gilli</i>	52	53	54	55	56	57	58	59	60	61	62	63	64
<i>N. ocellatus</i>	2	18	76	38	5								
<i>N. monocellatus</i>			1	13		37	15	1					
<i>N. unicolor</i>	1	2	39	27	1								
<i>N. marginatus</i>			1	3	15	8	1						
<i>N. elongatus</i>								6	9	1	1	1	3
<i>N. brasiliensis</i>										1	1	1	2
<i>N. multidigitatus</i>											1		

Table 1. Continued.

	Pseudobrach filaments						No. of long gill rakers					
	2	3	4	5	6	7	10	11	12	13	14	15
<i>N. gilli</i>	6	28	13	2				3	13	29	7	
<i>N. ocellatus</i>	19	36	6					1	3	28	29	7
<i>N. monocellatus</i>	31	23	8					11	38	18		
<i>N. unicolor</i>												
<i>N. marginatus</i>	21	9					7	7	22	1		
<i>N. elongatus</i>	3	24	7				7	18	9	2		
<i>N. brasiliensis</i>	1	5	10					9	9	5	2	
<i>N. multidigitatus</i>	2	1	4				1	3	3	3		
	1						1					
Ventral fin length in % of standard length												
<i>N. gilli</i>	10	11	12	13	14	15	16	17	18	19	20	21
<i>N. ocellatus</i>						1	1	2	6	19	12	8
<i>N. monocellatus</i>							4	10	11	20	8	6
<i>N. unicolor</i>								2	13	21	13	5
<i>N. marginatus</i>								7	6	6	10	1
<i>N. elongatus</i>											3	5
<i>N. brasiliensis</i>												1
<i>N. multidigitatus</i>												
								1				

Table 2. Meristic and morphometric characters of *Neobythites gilli*.

	Holotype USNM 37340	98 non- type specimens	Average of total material
Standard length	80	59–229	
Meristic characters			
Dorsal fin	90	88–97	92.5 [125]
Caudal fin	8	8	8.0 [75]
Anal fin	75	73–81	76.8 [133]
Pectoral fin	24	23–25	24.2 [48]
Pseudobr. filaments	3	3–6	4.2 [49]
Precaudal vertebrae	11	11–13	12.0 [152]
Total vertebrae	54	52–56	54.2 [139]
Long rakers on anterior gill arch	14	12–15	13.8 [52]
Ant. dorsal ray above vertebra no.	5	4–6	5.0 [85]
Ant. anal ray below dorsal ray no.	18	17–21	19.0 [83]
Ant. anal ray below vertebra no.	14	14–15	14.3 [83]
Morphometric characters in % of SL			
Head length	22.5	20.5–25.5	22.7 [83]
Depth at anus	16.5	15.0–19.0	17.0 [92]
Upper jaw	12.0	10.5–14.5	11.6 [41]
Hor. eye window	5.9	4.7–6.9	5.6 [49]
Preanal	44.5	38.5–45.5	41.9 [43]
Predorsal	25.0	22.0–27.5	25.4 [54]
Base of ventral fin to anal fin origin	23.5	19.5–26.5	23.9 [32]
Length of ventral fin	15.0	15.0–22.5	19.5 [55]
In % of head-length			
Longest gill filaments on ant. arch	6.7	5.3–9.3	7.2 [34]

Table 3. Position and number of ocelli in *Neobythites ocellatus* (141 specimens examined) and *N. gilli* (173 examined).

	<i>N. ocellatus</i>	<i>N. gilli</i>
Dorsal fin		
Snout-1. ocellus	27(29.7)33 % SL [75*	27(29.3)31 % SL [8
Snout-2. ocellus	43(46.4)51 % SL [127	41(44.7)49 % SL [161
Snout-3. ocellus	56(58.0)60 % SL [4	59(63.0)67 % SL [124
Snout-4. ocellus	61(64.5)69 % SL [127	75(77.4)80 % SL [8
Snout-5. ocellus	72(73.0)74 % SL [5	
Snout-6. ocellus	75(78.3)82 % SL [102	
Snout-7. ocellus	80(85.3)88 % SL [27	
Snout-8. ocellus	91(92.0)93 % SL [3	
Anal fin		
Snout-1. ocellus	54(63.8)67 % SL [8	
Snout-2. ocellus	74(76.6)79 % SL [7	
Snout-3. ocellus	80% SL [1	

\* the number after the bracket indicates the frequency in which this particular ocellus is found.

**Distribution.**—The material here examined comes from 44 stations all situated in the Gulf of Mexico. The map (Fig. 4) indicates an uneven distribution but it rather shows where most fishing has taken place. The material was caught at depths between 59 and 229 m. The restricted distribution seems real, as much trawling has taken place immediately east of the Gulf without catching specimens of *N. gilli*.

*Neobythites ocellatus* Günther, 1887

(Figs. 3,5–7)

*Neobythites ocellatus* Günther, 1887:103, pl. XXI, fig. B (type locality 9°5'S, 34°50'W).

*Neobythites gilli* (part.): Goode and Bean, 1896:325 (*ocellatus* is here treated as a junior synonym of *gilli*, an incorrect view which has been followed by most subsequent ichthyologists).

*Neobythites gilli*: Nolf and Stringer, 1992:53, pl. 12, fig. 9 (otoliths from early Miocene from Trinidad and the Dominican Republic compared to recent otoliths of *ocellatus* and not to *gilli* as stated in their paper).

**Material examined.**—(309 specimens, SL 45–162): HOLOTYPE: C, SL 86, off northeastern Brazil, 9°5'S, 34°50'W, RV CHALLENGER Sta. 122, 641 m, 10 Sep. 1873, BMNH 1887.12.7.43. NON-TYPE MATERIAL: 1, SL 123, off Colombia, 9°30.8'N, 76°25.5'W, RV ALBATROSS Sta. 2143, 284 m, 23 Mar. 1884, USNM 64600. — 3, SL 112–132, off Puerto Rico, 18°32'N, 65°21'W, RV CAROLINE Sta 93, 476 m, 2 Apr. 1933, USNM 108422. — 1, SL 141, off Puerto Rico, 18°40'N, 64°51'W, RV CAROLINE Sta. 99, 403 m, 3 Apr. 1933, USNM 108423. — 4, SL 75–118, off Puerto Rico, 18°40'N, 64°50'W, RV CAROLINE Sta. 100, 275 m, 4 Apr. 1933, USNM 108420. — C, SL 108, off southcoast of Cuba, 22°7'N, 81°8'W, RV ATLANTIS Sta. 2960, 494 m, 18 Feb. 1938, MCZ 39280. — C, SL 118, off southcoast of Cuba, 22°7'N, 81°8.5'W, RV ATLANTIS Sta. 2962C, 320–384 m, 24 Feb. 1938, MCZ 39323. — F, SL 110, off southcoast of Cuba, 22°7'N, 81°8.5'W, RV ATLANTIS Sta. 2962D, 320–384 m, 24 Feb. 1938, MCZ 39300. — 3 F, SL 118–123, off southcoast of Cuba, 22°7'N, 81°8'W, RV ATLANTIS Sta. 2963, 329–348 m, 25 Feb. 1938, MCZ 39283. — 2 C, SL 117–136, Old Bahama Channel, 22°44.5'N, 78°41'W, RV ATLANTIS Sta. 2982D, 275–329 m, 11 Mar. 1938, MCZ 39281. — F, SL 100, Old Bahama Channel, 22°34.5'N, 78°16'W, RV ATLANTIS Sta. 3397, 329 m, 29 Apr. 1939, MCZ 39332. — 1 C and 1 F, SL 115–150, Old Bahama Channel, 22°41'N, 78°39'W, RV ATLANTIS Sta. 3407, 366 m, 29 Apr. 1939, MCZ 38736. — 3 F, SL 92–128, Old Bahama Channel, 22°51.5'N, 78°55.5'W, RV ATLANTIS Sta. 3415, 384 m, 29 Apr. 1939, MCZ 39320. — 3 C, 1 F and 2?, SL 112–148, Old Bahama Channel, 22°50'N, 78°55'W, RV ATLANTIS Sta. 3416, 366 m, 30 Apr. 1939, MCZ 39263. — C, SL 140, Old Bahama Channel, 22°50'N, 78°56'W, RV ATLANTIS Sta. 3417, 366 m, 30 Apr. 1939, MCZ 39256. — C, SL 122, Old Bahama Channel, 22°49'N, 79°00'W, RV A ATLANTIS Sta. 3418, 357 m, 30 Apr. 1939, MCZ 38735. — 1 C, 4 F and 1?, SL 61–117, Old Bahama Channel, 22°46.5'N, 79°00'W, RV ATLANTIS Sta. 3419, 329 m, 30 Apr. 1939, MCZ 39508. — F, SL 117, Old Bahama Channel, 22°49'N, 79°4'W, RV ATLANTIS Sta. 3420, 348 m, 30 Apr. 1939, MCZ 39262. — 2 C, SL 146–148, Old Bahama Channel, 22°49'N, 79°7'W, RV ATLANTIS Sta. 3421, 430 m, 30 Apr. 1939, MCZ 39253. — 2 C, SL 121–145, Old Bahama Channel, 22°48'N, 79°9'W,

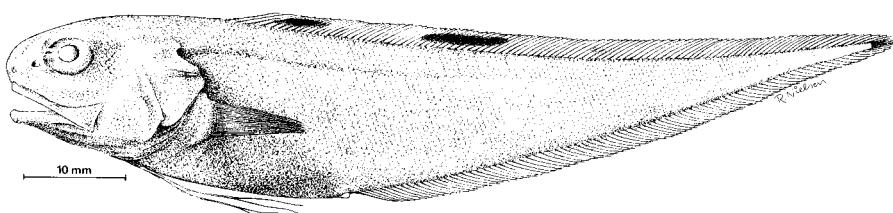


Figure 5. *Neobythites ocellatus*. Holotype, BMNH 1887.12.7.43, SL 86.

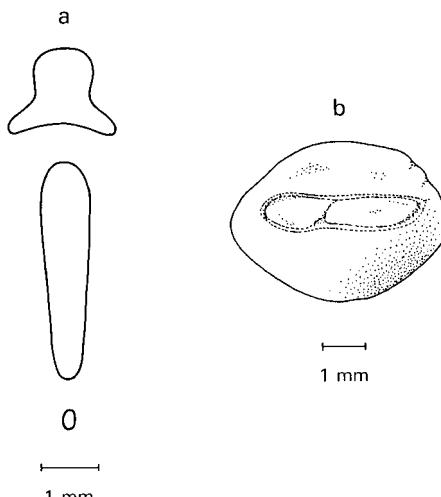


Figure 6. *Neobythites ocellatus*. a) Vomer and basibranchial tooth patches of USNM 309227, SL 138; b) Left sagitta of holotype.

RV ATLANTIS Sta. 3422, 430 m, 30 Apr. 1939, MCZ 39276. — 1, SL 100, Florida Strait, 27°27'N, 78°58'W, RV COMBAT Sta. 235, 329 m, 2 Feb. 1957, USNM 340917. — 1, SL 87, off Venezuela, 10°59'N, 66°00'W, RV ATLANTIS Sta. 2700, 256 m, 1 Nov. 1957, USNM 309242. — 1, SL 98, off Puerto Rico, 18°37'N, 65°4'W, RV OREGON Sta. 2606, 384 m, 25 Sep. 1959, USNM 340923. — C, SL 162, off Saba, 17°38.5'N, 63°27'W, RV OREGON Sta. 2633, 348 m, 30 Sep. 1959, USNM 309225. — 1, SL 135, Caribbean Sea, 17°47'N, 66°4'W, RV OREGON Sta. 2639, 412–439 m, 4 Oct. 1959, UF 207003. — 1, SL 102, off Puerto Rico, 18°13'N, 64°14.5'W, RV OREGON Sta. 2649, 229 m, 6 Oct. 1959, UF 207002. — 1, SL 115, off Puerto Rico, 18°18'N, 67°17.5'W, RV OREGON 2653, 549 m, 6 Oct. 1959, USNM 340922. — 1, SL 131, off Puerto Rico, 18°24'N, 67°15'W, RV OREGON Sta. 2656, 183 m, 6 Oct. 1959, USNM 309239. — 7, SL 75–146, off Puerto Rico, 18°25.5'N, 67°14'W, RV OREGON Sta. 2658, 458 m, 7 Oct. 1959, USNM 309245. — 1, SL 95, off Puerto Rico, 18°31.5'N, 66°50'W, RV OREGON Sta. 2665, 329 m, 7 Oct. 1959, USNM 340920. — 1, SL 124, Caribbean Sea, 16°40'N, 82°52'W, RV EXPLORER Sta. 1C, 366 m, 11 Mar. 1960, USNM 326145. — C, SL 98, Great Bahama Bank, 23°34.5'N, 79°7'W, RV SILVER BAY Sta. 2457, 458 m, 5 Nov. 1960, UF 15651. — 6, SL 92–123, Great Bahama Bank, 23°52'N, 79°11'W, RV SILVER BAY Sta. 2468, 366–384 m, 6 Nov. 1960, UF 211636. — 1 C, 1 male and 1?, SL 74–110, Florida Strait, 24°25'N, 79°13'W, RV SILVER BAY Sta. 2470, 229 m, 7 Nov. 1960, ZMUC P77533–535. — 1, SL 115, Florida Strait, 25°29.5'N, 79°9'W, RV SILVER BAY Sta. 2479, 366 m, 9 Nov. 1960, USNM 309228. — 4, SL 69–143, Old Bahama Channel, 23°5'N, 78°49'W, RV SILVER BAY Sta. 3512, 412–458 m, 7 Nov. 1961, UF 210884. — 4, SL 83–115, Caribbean Sea, 17°53'N, 77°56'W, RV OREGON Sta. 3548, 275 m, 16 May 1962, UF 210886. — 5 C, SL 89–128, Caribbean Sea, 17°50'N, 77°52'W, RV OREGON Sta. 3549, 311 m, 16 May 1962, BMNH 1967.11.9.1–5. — 7, SL 115–126, Caribbean Sea, 14°10'N, 81°58'W, RV OREGON Sta. 3566, 275–293 m, 21 May 1962, USNM 340921. — 10, SL 95–112, Caribbean Sea, 12°26'N, 82°26'W, RV OREGON Sta. 3579, 229 m, 23 May 1962, USNM 340919 (2, SL 110–112) and USNM 340924 (8, SL 95–112). — C, SL 120, Caribbean Panama, 9°12'N, 81°30'W, RV OREGON Sta. 3585, 247–256 m, 25 May 1962, USNM 340893. — 7, SL 84–115, Caribbean Sea, 9°18'N, 80°27'W, RV OREGON Sta. 3588, 183 m, 29 May 1962, UF 211066. — 13, SL 71–138, Caribbean Sea, 9°18'N, 80°22'W, RV OREGON Sta. 3590, 229 m, 29 May 1962, MCZ 49039 (2 C, SL 127–132) and USNM 309248 (11, SL 71–138). — 20, SL 77–127, Caribbean Sea, 9°2'N, 81°26'W, RV OREGON Sta. 3595, 183 m, 30 May 1962, UF 211051. — 19, SL 98–130, Caribbean Sea, 9°4'N, 81°25'W, RV OREGON Sta. 3597, 275–293 m, 31 May 1962, MCZ 49040 (8 C and 2?, SL 102–130), USNM

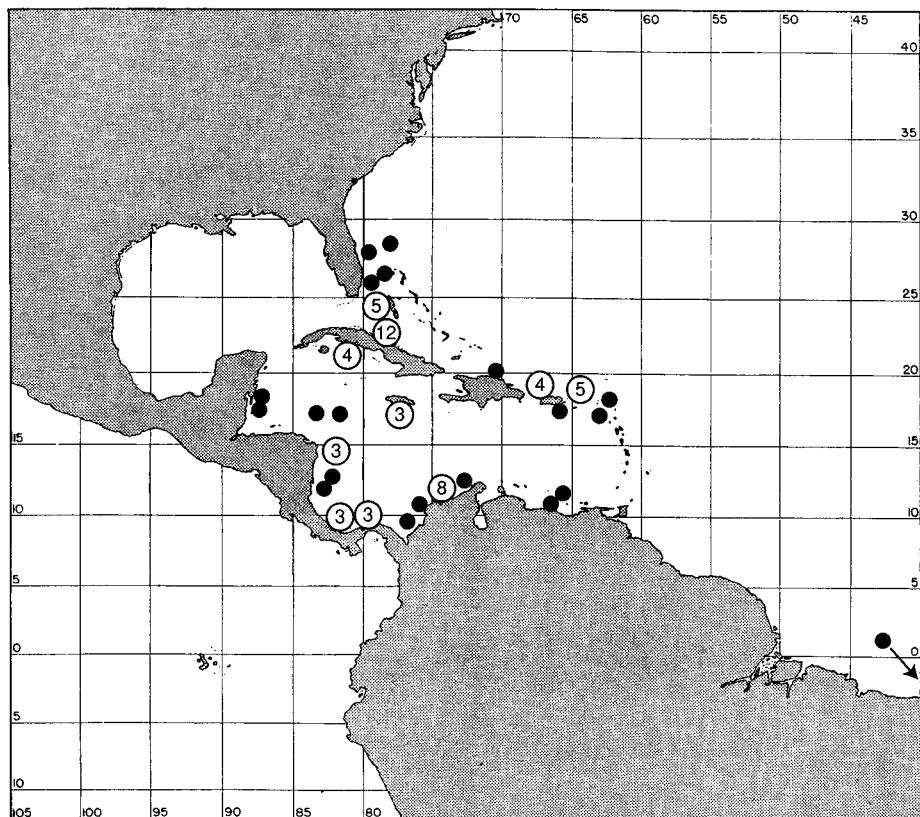


Figure 7. Records of *Neobrythites ocellatus* — the numbers indicate the number of neighbouring stations.

199605(2, SL 114–118), USNM 308899(3, SL 106–110) and ZMUC P771206–1209(4 C, SL 98–124). — 5, SL 130–155, Caribbean Sea, 16°45'N, 81°27'W, RV OREGON Sta. 3626, 275 m, 7 June 1962, USNM 309246. — 1, SL 141, Caribbean Sea, 17°17'N, 87°59'W, RV OREGON Sta. 3636, 229 m, 10 June 1962, USNM 340916. — 1, SL 97, Florida Strait, 27°10'N, 79°55'W, RV GERDA Sta. 174, 171–189 m, 30 June 1963, UF 213150. — 3 C, 1 F and 2?, SL 103–142, Caribbean Hispaniola, 19°48.5'N, 70°30.5'W, RV SILVER BAY Sta. 5166, 403–549 m, 15 Oct. 1963, USNM 308900. — 1, SL 50, Florida Strait, 25°27.5'N, 79°20'W, RV GERDA Sta. 274, 312–348 m, 30 Mar. 1964, UF 227376. — 1, SL 59, Bimini Islands, 25°23'N, 79°17'W, RV GERDA Sta. 276, 329 m, 31 Mar. 1964, UF 217691. — 20, SL 95–132, off Colombia, 11°9.5'N, 74°24.5'W, RV OREGON Sta. 4838, 311–329 m, 16 May 1964, USNM 309249. — 5 C and 1 F, SL 112–122, Caribbean Sea, 11°9.5'N, 74°25'W, RV OREGON Sta. 4858, 293 m, 19 May 1964, MCZ 45974. — 1, SL 120, off Colombia, 11°9'N, 74°26.5'W, RV OREGON Sta. 4859, 329–357 m, 19 May 1964, USNM 309232. — 9, SL 122–143, off Colombia, 11°9'N, 74°26'W, RV OREGON Sta. 4860, 284–293 m, 19 May 1964, USNM 200553. — 2, SL 78–93, off Colombia, 11°2.8'N, 75°10'W, RV OREGON Sta. 4873, 183–201 m, 23 May 1964, USNM 309247. — 6, SL 110–137, Caribbean Sea, 11°50'N, 73°5'W, RV OREGON Sta. 4911, 320–348 m, 31 May 1964, USNM 309250 (4 C, SL 120–137) and USNM 300915(2, SL 110–135). — 1, SL 80, Bahama Islands, 26°2'N, 79°18'W, RV GERDA Sta. 508, 403 m, 2 Mar. 1965, UF 220761. — 1, SL 111, Caribbean Sea, 18°10'N, 63°16'W, RV OREGON Sta. 5916, 339 m, 25 Feb. 1965, USNM 309231. — 12, SL 85–105, off Colombia, 9°40'N, 79°7'W, RV OREGON Sta. 5738, 220 m, 19 Oct. 1965, USNM 309243. — 29, SL 100–155, Caribbean Sea, 17°28.5'N, 87°57.5'W, RV OREGON Sta. 6404, 275–329 m, 23 Jan. 1967, UF 229534. — 5, SL 71–110, Caribbean Sea,

12°7'N, 82°44'W, RV OREGON Sta. 6444, 192 m, 7 Feb. 1967, UF 232131. — 1, SL 124, Caribbean Sea, 10°42.5'N, 66°21'W, RV PILLSBURY Sta. 738, 137–192 m, 22 July 1968, UF 230445. — 8, SL 45–98, Caribbean Sea, 11°20'N, 73°48.5'W, RV PILLSBURY Sta. 783, 143–174 m, 31 July 1968, UF 230172. — 1, SL 68, Caribbean Sea, 10°21.9'N, 75°47.3'W, RV P PILLSBURY Sta. 797, 150–170 m, 1 Aug. 1968, UF 230138. — 4 C, SL 120–138, Caribbean, 14°17'N, 81°55'W, RV OREGON II Sta. 10195, 329 m, 19 Nov. 1968, USNM 309227. — 1, SL 105, off Colombia, 11°3'N, 75°18'W, RV OREGON II Sta. 10260, 366 m, 2 Dec. 1968, USNM 309236. — 8, SL 75–125, off Colombia, 11°24'N, 73°47'W, RV OREGON II Sta. 10289, 275 m, 5 Dec. 1968, USNM 204356 (SL 95), USNM 309237 (6, SL 75–125) and USNM 340918 (SL 113). — 1 C and 1?, SL 145–154, Santaren Channel, Cuba, 23°25'N, 79°40'W, RV OREGON II Sta. 10862, 458 m, 16 Dec. 1969, USNM 309229. — 5, SL 68–113, Caribbean Sea, 17°56.7'N, 78°0'W, RV PILLSBURY Sta 1232, 210–265 m, 7 July 1970, UF 230466. — 13, SL 93–122, Caribbean Sea, 14°53.9'N, 81°23.2'W, RV PILLSBURY Sta. 1356, 296–375 m, 31 Jan. 1971, UF 229247.

*Remarks to material.*—In all, 309 specimens are referred to *N. ocellatus* of which 79 specimens (SL underlined in the "Material examined") were examined in detail and form the basis of Tables 1, 3 and 4.

*Diagnosis.*—*N. ocellatus* differs from all other Atlantic *Neobythites* spp. in the following combination of characters: 3–6 (most often 4) ocelli in dorsal fin, 0–1 (weak) spine on hind margin of preopercle, total vertebrae 55–59, dorsal finrays 96–101 and anal finrays 80–85.

*Similarity.*—The most similar Atlantic *Neobythites* sp. is *gilli* (cf. comparison p. xx).

*Description.*—The principal meristic and morphometric characters are given in Tables 1, 3 and 4.

Snout rather blunt, about equal in length to eye window. Maxilla ends behind eye. Teeth small and granular in jaws and larger on palatines and the triangular vomer; anterior basibranchial tooth patch narrow, posterior small and oval (Fig. 6A). Anterior nostril with a small skin-flap, posterior larger and a simple hole. Mandibular canal with four pores, the anterior close to lower jaw symphysis. No papillae or fringes on snout and lower lip. Hind margin of preoperculum without or with a broad, weak spine; spine very rarely pointed. Opercular spine strong and straight. Head and body with small, cycloid scales. Lateral line indistinct. Ventral fins reach 2/3 or more of the distance to anal fin. Anterior gill arch with 1–3 small knobs and 4–5 long rakers on upper branch, one long raker in the angle, and lower branch with 9–11 long rakers and 3–7 small knobs.

Sagittal otolith (Fig. 6B) oval and thin with a non-undulating rim; sulcus distinct with a more or less clear separation of cauda and ostium; ostium almost twice as long as cauda; no ostegal channel; ventral area larger than dorsal area.

**AXIAL SKELETON (FROM RADIOGRAPHS).**—Tips of all neural and haemal spines thin and pointed; vertebrae 3–8 with depressed neural spines slightly shorter than spine on second vertebra; base of neural spines 3–10 enlarged; parapophyses on posterior six precaudal vertebrae; pleural ribs on posterior 3–12 precaudal vertebrae and epipleural ribs nos. 3–10.

**COLORATION.**—The holotype, illustrated after 110 yrs of preservation, showing distinct 1–2 ocelli and a faint third ocellus (Fig. 5). The number and position of ocelli is discussed below. Eyes and peritoneum bluish, area around anus dark, mouth and branchial cavities dark, head and body slightly brownish darker on anterior part of head and upper lips. The most recently caught specimen was taken in 1971.

Table 4. Meristic and morphometric characters of *Neobythites ocellatus*.

	Holotype BMNH 1887 12.7.43	78 non- type specimens	Average of total material
Standard length	86	74–162	
Meristic characters			
Dorsal fin	98	96–101	97.8 [60]
Caudal fin	8	8	8.0 [74]
Anal fin	82	80–85	82.4 [68]
Pectoral fin	24	23–28	25.4 [37]
Pseudobr. filaments	3	3–5	3.8 [61]
Precaudal vertebrae	12	12–13	12.0 [69]
Total vertebrae	57	55–59	57.0 [67]
Rakers on anterior gill arch	15	12–16	14.6 [68]
Ant. dorsal ray above vertebra no.	5	4–6	5.1 [48]
Ant. anal ray below dorsal ray no.	20	17–21	19.2 [43]
Ant. anal ray below vertebra no.	14	14–15	14.2 [45]
Morphometric characters in % of SL			
Head length	22.5	21.0–24.5	22.7 [67]
Depth at anus	18.0	14.0–19.0	16.7 [65]
Upper jaw	11.5	11.0–12.5	11.5 [62]
Hor. eye window	6.0	4.5–6.1	5.1 [53]
Preanal	42.0	36.0–45.0	41.5 [60]
Predorsal	24.5	22.5–27.5	25.1 [63]
Base of ventral fin to anal fin origin	25.5	21.0–29.5	24.0 [60]
Length of ventral fin	17.0	16.5–23.0	19.3 [59]
In % of head-length			
Longest gill filament on ant. arch	5.1	4.8–8.9	7.1 [52]

**OCELLI.**—Figure 3 shows the number and position of ocelli on the dorsal fin and Table 3 additionally on the anal fin. Dorsal fin: Of the 141 specimens examined two had no ocelli, 16 had two ocelli and 123 had between 3 and 6 ocelli. The two without ocelli are from the same station as a distinct *ocellatus* specimen. The number of rays in the dorsal and anal fins of these two and of the 16 specimens with two ocelli correspond to those of *ocellatus*. Table 3 and Figure 3 show that ocelli can be found in eight different positions. The few specimens with an ocellus in position 3, 5 or 8 all had ocelli in the positions immediately before and after, indicating that 3, 5 and 8 are distinct groups. More than four ocelli are found in about 20 specimens the standard lengths of which varies between 74 and 140 mm. Anal fin: Overall 10 specimens had ocelli in the anal fin varying between 1 and 3. Six of the specimens are from the same sample.

**Biology.**—*N. ocellatus* is found on the lower continental shelf and on the upper continental slope (137–641 m depth). Contents of stomachs and intestines showed many digested remains of mainly crustaceans. Among 79 examined specimens 17 were males, 43 females and the rest too immature to sex. Only two specimens were ripe, both females, with a SL of 132–138 mm and an egg diameter of 0.5–1 mm.

**Distribution.**—The present material derives from 70 stations from north of the Bahamas to off Venezuela at 10°N and from a single station (the type locality) off Brazil at 9°S (Fig. 7). No specimens were caught in the Gulf of Mexico and between Venezuela and the type locality. The absence from the Gulf of Mexico seems real as thousands of trawl hauls

have been carried out here while very little trawling has taken place off the northeastern coast of Brazil. The material was caught at depths between 137 and 641 m.

***Neobythites monocellatus* new species**

(Figs. 8–10)

*N. gillii* (non Goode and Bean): Arai, 1983:234, fig.

**Material examined.**—(71 specimens, 36–154 mm): HOLOTYPE: ♂, SL 117, off Venezuela, 9°53'N, 59°53'W, RV OREGON Sta. 1983, 229 m, 3 Nov. 1957, USNM 309234. PARATYPES: ♂, SL 86, West Caribbean, 16°39'N, 81°43'W, RV OREGON Sta. 1878, 229 m, 22 Aug. 1957, UF 204794. — 6 ♂ and 5 ♀, SL 90–122, same station as holotype, USNM 309234 (10, SL 90–118) and ZMUC P771180 (1, SL 122). — 6 ♂ and 11 female, SL 101–133, off Venezuela, 9°41'N, 59°47'W, RV OREGON 1985, 275 m, 3 Nov. 1957, USNM 185417 (11, SL 102–137) and 309241 (3, SL 101–106) and ZMUC P771184-86 (3, SL 103–111). — ♀, SL 92, off Orinoco River, 9°36'N, 59°44'W, RV OREGON Sta. 1987, 146 m, 4 Nov. 1957, USNM 309235. — 4 ♂ and 5 ♀, SL 102–132, off French Guiana, 7°15'N, 53°25'W, RV OREGON Sta. 2022, 210 m, 9 Nov. 1957, USNM 185391 (8, SL 102–132) and ZMUC P771187 (1, SL 120). — 1 ♂, SL 130, off French Guiana, 7°15'N, 53°21'W, RV OREGON Sta. 2023, 247 m, 9 Nov. 1957, USNM 309238. — 1 ♀, SL 154, off Suriname, 7°27'N, 54°32'W, RV OREGON Sta. 2290, 201 m, 8/9 Sep. 1958, UF 229530. — 1 ♀, SL 124, off Colombia, 11°9.5'N, 74°24.5'W, RV OREGON Sta. 4838, 311–329 m, 16 May 1964, USNM 340897. — 8 ♂ and 3 ♀, SL 120–148, off Tobago, 11°30'N, 60°46'W, RV OREGON Sta. 5028, 366–439 m, 22 Sep. 1964, UF 101518 (4, SL 120–139), USNM 309244 (6, SL 122–148) and ZMUC P771183 (1, SL 129). — 1 ♂, SL 43, northeast of Arboletes, 9°5.6'N, 76°32.1'W, RV PILLSBURY Sta. 398, 117–174 m, 17 July 1966, UF 222168. — 1 ♀ and 1 ?, SL 36–53, northeast of Arboletes, 9°1.3'N, 76°40.2'W, RV PILLSBURY Sta. 399, 118–177 m, 17 July 1966, UF 222153. — 1 ♂ and 1 ♀, SL 36–49, off French Guiana, 7°10'N, 53°36'W, RV PILLSBURY Sta. 658, 126–135 m, 10 July 1968, UF 230439. — 2 ♀, SL 47–52, off Venezuela, 11°39.6'N, 69°22.1'W, RV PILLSBURY Sta. 757, 161–187 m, 27 July 1968, UF 230449. — 1 ♂ and 8 ♀, SL 67–98, off Trinidad, 10°32'N, 60°23'W, RV PILLSBURY Sta. 838, 170–183 m, 30 Aug. 1969, UF 230418 (7, SL 63–82) and ZMUC P771181-82 (2, SL 67–81).

**Tentatively referred.**—1 ♀, SL 104, off Suriname, 6°34'N, 52°26'W, Japan Marine Fisheries Research Center, trawl, 174–175 m, 22 Jan. 1981, NSMT P 40195.

**Diagnosis.**—*N. monocellatus* differs from all other Atlantic *Neobythites* spp. by having one ocellus in the dorsal fin placed a little anterior to the midpoint of the fish, and by the following combination of characters: 12(13) precaudal vertebrae, ventral fin length 17.5–23.5 % SL, dorsal finrays 93–99, anal finrays 78–83, total vertebrae 54–58, preopercular spine absent.

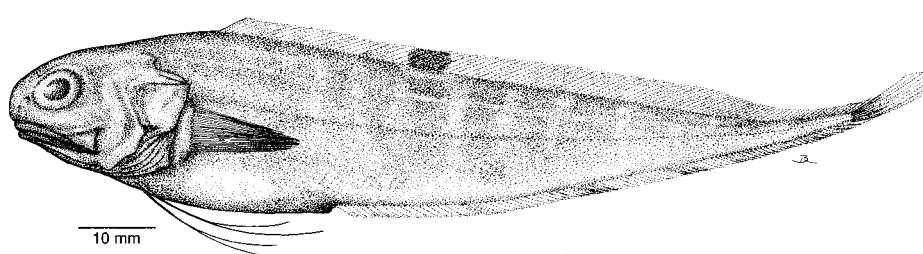


Figure 8. *Neobythites monocellatus*. Holotype, USNM 309234, SL 117.

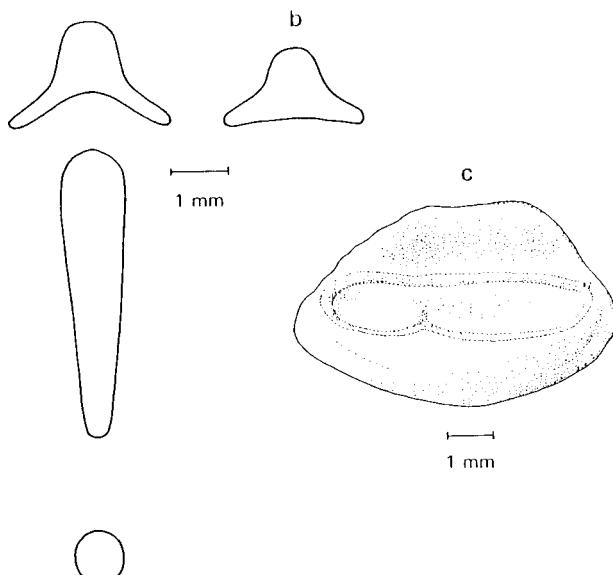


Figure 9. *Neobythites monocellatus*. a) Vomer and basibranchial tooth patches of holotype; b) Vomer of tentatively referred specimen, NSMT P40195, SL 104; c) Left sagitta of paratype, USNM 309244, SL 148.

**Similarity.**—In two other species, *gilli* and *ocellatus*, the preopercular spine is weak or absent and the dorsal fin is provided with ocelli. Judging from the number of ocelli *monocellatus* is closest to *gilli* which normally has two ocelli only while *ocellatus* most often has four. In meristic characters *monocellatus* is closer to *ocellatus*.

**Description.**—The principal meristic and morphometric characters are given in Tables 1 and 5.

**HOLOTYPE:** Snout blunt, length about 2/3 of eye window. Maxilla ends well behind eye. Teeth small and granular in jaws and on palatines; median part of vomer well developed and relatively large teeth; anterior basibranchial tooth patch long and narrow, posterior small and circular (Fig. 9A). Anterior nostril with a small flap, posterior larger and a simple hole. Mandibular canal with four pores on each side, the anterior close to lower jaw symphysis. No papillae on lower lip or fringes on snout. No spines on hind margin of preopercle; a strong, sharp spine on operculum. Many of the cycloid scales lost. Lateral line indistinct. Ventral fins reach almost to anal fin. Anterior gill arch with five long rakers on upper branch, one long in the angle and lower branch with nine long and five very small rakers.

Sagittal otolith (Fig. 9C) oval and rather thin with a somewhat undulating rim and a large, broad sulcus with well separated ostium and cauda; ostium twice as long as cauda; osteal channel present; distance from posterior rim to cauda short.

**AXIAL SKELETON (FROM RADIOGRAPHS).**—Tips of all neural and haemal spines thin and pointed; vertebrae 3–7 with slightly depressed neural spines not much shorter than spine of second vertebra; base of neural spines 4–12 enlarged; parapophyses on vertebrae 7–12 increasing in length posteriorad; pleural ribs on vertebrae 3 to 11–12 and epipleural ribs on 3 to 10–11.

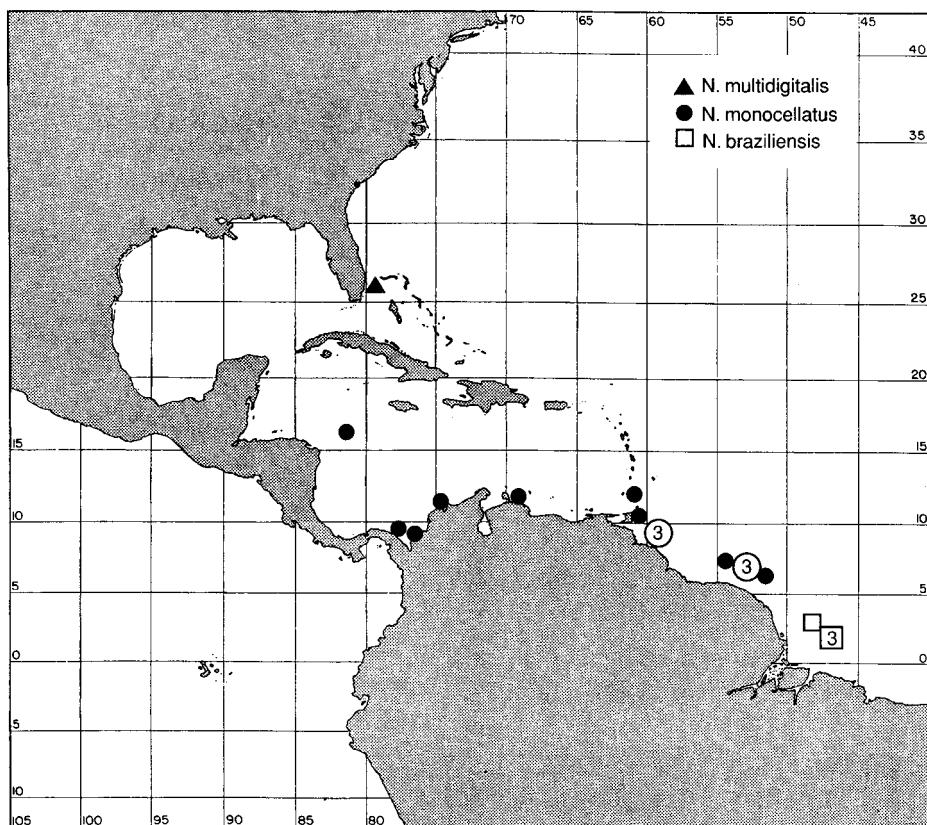


Figure 10. Records of *Neobythites brasiliensis*, *N. monocellatus* and *N. multidigitalis* — the numbers indicate the number of neighbouring stations.

COLORATION.—A distinct ocellus in dorsal fin placed anterior to midpoint of fish and well behind anus; body with several, indistinct, vertical bands, some continuing on anal fin as dark markings; dark pigmentation on pectoral fins, on lips, and ventrally on head and anterior body; area around anus, branchial cavity and peritoneum solid black.

PARATYPES: The 69 paratypes are very similar to the holotype. The main difference lies in the various degrees of pigmentation which can be due to both the period of preservation and to length, as small specimens tend to be less pigmented than larger.

TENTATIVELY REFERRED SPECIMEN: A 104 mm SL specimen has not been included in the description of *monocellatus*. It differs from all specimens of the type material in the shape of the vomer (Fig. 9B), by a slightly larger head (25% SL) and by being much less pigmented. The latter could be explained by the preservation, but on the other hand the specimen was caught 12 yrs later than the latest specimen from the type series. Since all other characters fall within the variation of *monocellatus* it is tentatively referred to this species.

*Biology*.—The stomachs and intestines contain well digested parts of mainly crustaceans. In all 68 specimens could be identified to sex. None of the 29 males and four (SL 116–139) of the 39 females was ripe, with eggs up to about 0.5 mm in diameter.

Table 5. Meristic and morphometric characters of *Neobythites monocellatus*.

	Holotype USNM 309234	Paratypes 69 specimen	Average of total material
Standard length	117	37–154	
Meristic characters			
Dorsal fin	95	93–99	96.5 [67]
Caudal fin	8	8	8.0 [63]
Anal fin	80	78–83	80.4 [68]
Pectoral fin	27	24–27	25.7 [51]
Pseudobr. filaments	4	4–6	4.6 [62]
Precaudal vertebrae	12	12–13	12.0 [71]
Total vertebrae	56	54–58	56.4 [70]
Long rakers on anterior ill arch	15	13–15	14.1 [67]
Ant. dorsal ray above vertebra no.	5	5–6	5.1 [70]
Ant. anal ray below dorsal ray no.	18	17–21	19.1 [70]
Ant. anal ray below vertebra no.	14	14–15	14.5 [70]
Morphometric characters in % of SL			
Head length	22.0	21.0–24.0	22.2 [70]
Depth at anus	18.0	14.0–19.5	17.1 [67]
Upper jaw	11.0	10.5–13.0	11.6 [61]
Hor. eye window	5.6	4.9–7.0	5.6 [61]
Preanal	39.0	35.5–44.0	39.9 [66]
Predorsal	25.0	20.0–27.0	24.8 [66]
Base of ventral fin to anal fin origin	23.5	19.5–27.0	23.4 [64]
Length of ventral fin	21.5	17.5–23.5	20.3 [65]
Snout to ocellus	44.5	41–51	46.6 [70]
In % of head-length			
Longest gill filaments on ant. arch	8.2	6.2–9.1	7.6 [64]

**Distribution.**—Figure 10 shows that *N. monocellatus* was caught on 14 stations off northern South America and on a single station off Honduras on the continental shelf and the upper slope (117–439 m). There is a clear tendency for small specimens to be caught at shallower depths than larger.

**Etymology.**—The specific name refers to the single ocellus.

*Neobythites unicolor* Nielsen and Retzer, 1994  
(Figs. 11–13)

*Neobythites unicolor* Nielsen and Retzer, 1994: 993, fig. 2a (type locality 17°38.5'N, 63°27'W).

**Material examined.**—(66 specimens, 32–126 mm SL): HOLOTYPE: ♀, SL 90, East Caribbean Sea, 17°38.5'N, 63°27'W, RV OREGON Sta. 2633, bottom trawl, 348 m, 30 Sep. 1959, FMNH 69349. PARATYPES: 1 ♀ and 1 ♂, SL 82–104, West Caribbean Sea, 16°36'N, 82°37'W, RV OREGON Sta. 1868, bottom trawl, 320 m, 21 Aug. 1957, FMNH 69352(1, SL 82) and ZMUC P77940(1, SL 104). — 1 ♀, SL 103, East Caribbean Sea, 18°3'N, 67°27'W, RV OREGON Sta. 2643, bottom trawl, 275–330 m, 5 Oct. 1959, FMNH 69348. — 1 ♀, SL 100, East Caribbean Sea, 18°12'N, 67°18'W, RV OREGON Sta. 2648, bottom trawl, 275 m, 6 Oct. 1959, FMNH 69354. — 1 ♀ and 2?, SL 33–100, West Caribbean Sea, 20°26.3'N, 87°14.7'W, MBI Sta. 167, 10' otter trawl, 253–276 m, 11 Apr. 1976, TCWC 6207.2(2) and INHS 32130(1). — 2 ♀, SL 58–89, West Caribbean Sea, 20°20.5'N, 89°19.4'W, MBI Sta. 168, 10' otter trawl, 240–267 m, 11 Apr. 1976, TCWC 4469.3. NON-TYPE

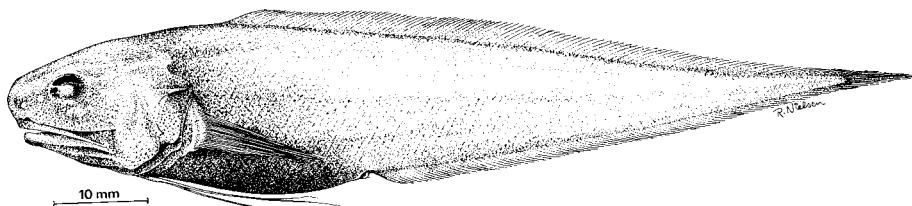


Figure 11. *Neobythites unicolor*. Holotype, FMNH 69349, SL 90.

MATERIAL: 2, SL 70–115, off Puerto Rico, 18°40'N, 64°51'W, RV CAROLINE Sta. 99 T.T. 579 and 580, 403 m, 3 Mar. 1933, USNM 108421. — 1 ♀, SL 88, off Cuba, 22°13'N, 81°10.5'W, RV ATLANTIS Sta. 3319, 357–393 m, 4 Apr. 1938, MCZ 39257. — 1 ♀, SL 72, Gulf of Mexico, 25°8'N, 84°19'W, RV OREGON Sta. 1026, 298 m, 19 Apr. 1938, MCZ 41866. — 1 ♂, SL 88, off Cuba, 22°49'N, 78°48'W, RV ATLANTIS Sta. 3412, 430 m, 29 Apr. 1938, MCZ 39327. — 1 ♂, SL 75, off Cuba, 22°48'N, 79°9'W, RV ATLANTIS Sta. 3422, 430 m, 30 Apr. 1938, MCZ 39396. — 1 ♀ and 1 ♂, SL 81–93, off Cuba, 22°55'N, 79°16'W, RV OREGON Sta. 1341, 439 m, 16 July 1955, UF 202019(1, SL 93) and ZMUC P771190(1, SL 81). — 1, SL 111, off Cuba, 22°59'N, 79°17'W, RV OREGON Sta. 1343, 40' flat trawl, 458 m, 16 July 1955, USNM 157876. — 3, SL 44–80, Florida Strait, 22°15'N, 79°13'W, RV COMBAT Sta. 445, 40' flat trawl, 366 m, 23 July 1957, USNM 309240. — 2, SL 70–88, Florida Strait, 24°4'N, 79°15'W, RV COMBAT Sta. 448, 40' flat trawl, 458 m, 24 July 1957, UF 202430. — 3, SL 90–96, Gulf of Mexico, 27°53'N, 96°41'W, RV OREGON Sta. 2477, 40' flat trawl, 224 m, 20 Apr. 1959, USNM 309223. — 1, SL 126, Gulf of Mexico, 24°28'N, 83°25'W, RV SILVER BAY Sta. 1190, 329 m, 7–8 June 1959, UF 205335. — 3, SL 80–100, off Puerto Rico, 18°37'N, 65°4'W, RV OREGON Sta. 2606, 40' flat trawl, 384 m, 25 Sep. 1959, USNM 340926. — 1 ♀ and 4 ♂, SL 87–99, off Saba, 17°38.5'N, 63°27'W, RV OREGON Sta. 2633, 40' flat trawl, 348 m, 30 Sep. 1959, USNM 309225. — 2, SL 96–98, off Puerto Rico, 18°24'N, 67°15'W, RV OREGON Sta. 2656, 40' flat trawl, 183 m, 6 Oct. 1959, USNM 309230. — 1, SL 65, Great Bahama Bank, 23°52'N, 79°11'W, RV SILVER BAY Sta. 2468, 366–384 m, 6 Nov. 1960, UF 232207. — 1, SL 87, off Grand Bahama Is., 27°23'N, 78°26'W, RV SILVER BAY Sta. 3471, 388–412 m, 25 Oct. 1961, USNM 340903. — 1, SL 109, off Haiti, 20°43'N, 73°33'W, RV SILVER BAY Sta. 3500, 549–915 m, 4 Nov. 1961, USNM 340925. — 2, SL 75–94, off Bimini, 25°15'N, 79°15'W, RV GERDA Sta. 236, 384 m, 30 Jan. 1964, UF 213874. — 1, SL 102, off Bimini, 25°17'N, 79°14'W, RV GERDA Sta. 238, 399–406 m, 30 Jan. 1964, UF 217673. — 2 ♀ and 1 ♂, SL 49–94, off Grand Bahama Is., 27°25'N, 78°41'W, RV GERDA Sta. 251, 306–311 m, 5 Feb. 1964, UF 214148 (2, SL 49–94) and ZMUC P771191 (1, SL 84). — 1, SL 64, off Grand Bahama Is., 27°37'N, 78°56'W, RV GERDA Sta. 256, 855–937 m, 6 Feb. 1964, UF 213838. — 1, SL 72, off Bimini, 25°21'N, 79°25.5'W, RV GERDA Sta. 277, IKMT, fishing depth 289–805 m, sounding 805 m, 31 Mar. 1964, UF 215640. — 1, SL 50, off Grand Bahama Is., 26°27'N, 78°43'W, RV GERDA Sta. 533, 384–403 m, 4 Mar. 1965, UF 217479. — 1, SL 49, off Bimini, 25°55'N, 79°19'W, RV GERDA Sta. 626, 381 m, 29 June 1965, UF 217727. — 2, SL 80–107, off Honduras, 17°24'N, 87°56.5'W, RV OREGON Sta. 6403, 262 m, 23 Jan. 1967, UF 229529. — 2, SL 98–99, off Honduras, 17°28.5'N, 87°57.5'W, RV OREGON Sta. 6404, 275–329 m, 23 Jan. 1967, UF 229558. — 2, SL 86–98, Straits of Florida, 23°51'N, 79°39'W, RV GERDA Sta. 1009, 359–432 m, 14 June 1968, UF 227361. — 2, SL 32–33, off Anegada Is., 18°47'N, 64°46.8'W, RV PILLSBURY Sta. 991, 375–564 m, 23 July 1969, UF 230454. — 2 ♀ and 3 ♂, SL 79–103, Turks Is. Passage, 20°53.1'N, 71°36'W, RV PILLSBURY Sta. 1425, 737–787 m, 19 July 1971, UF 230529 (4, SL 79–103) and ZMUC P771189 (1, SL 85). — 1, SL 74, Tongue of the Ocean, 25°8.2'N, 77°28.2'W, RV COLUMBUS ISELIN Sta. 7, 403–602 m, 2 July 1972, UF 230740. — ♀, SL 105, off Cuba, 21°46.8'N, 84°31.5'W, submersible, field no. JSL 3075, in glass sponge at 361 m, 31 Dec. 1997, Habana Inst. Oceanology.

**Remarks to material.**—In all, 66 specimens are referred to *N. unicolor* of which 31 (SL underlined in “Material examined”) were examined in detail and form the basis of Tables 1 and 6.

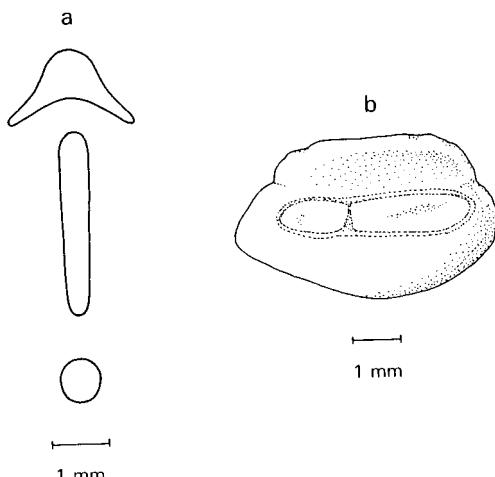


Figure 12. *Neobythites unicolor*. a) Vomer and basibranchial tooth patches of holotype; b) Left sagitta of TCWC 6207.2, SL 93.

**Diagnosis.**—*N. unicolor* differs from all other Atlantic *Neobythites* spp. with 0–1 preopercular spine, by lacking ocelli, by the spine on hind margin of preopercle being strong and sharp, and by the following combination of characters: dorsal finrays 96–101, anal finrays 80–86, total vertebrae 56–60 and a relatively long ventral fin (16.0–23.0% SL).

**Similarity.**—*N. unicolor* resembles *elongatus* and *multidigitatus* by not having ocelli, stripes or other colour markings, but differs from both by having only one spine (vs two spines) on the hind margin of preopercle; judging from the meristic characters it is most close to *elongatus*. Compared to the species with 0–1 preopercular spine it seems closest to *ocellatus* according to its meristic characters.

**Description.**—The principal meristic and morphometric characters are given in Tables 1 and 6.

Snout blunt, same length as eye window. Maxilla ends well behind eye. Teeth small and granular on jaws; subtriangular vomer and palatines with larger teeth; anterior basibranchial tooth patch long and narrow, posterior small and circular (Fig. 12A). Small, anterior nostril with skinflap, posterior larger nostril a simple hole. Mandibular canal with four pores on each side, anterior close to lower jaw symphysis. A few fringes on snout; no papillae on lower lip. Preopercle with one sharp spine, opercle with one straight, sharp spine. Small, cycloid scales on head and body. Ventral fins reaching almost to anal fin. Anterior gill arch with 1–3 short and three long rakers on upper branch, one long raker in angle and lower branch with 8–10 long and 2–6 short rakers.

Sagittal otolith (Fig. 12B) oval and moderately thick with a non-undulating rim; sulcus large with or without an osteal channel; ostium twice as long as cauda, the two colliculi weakly or not separated; cauda close to posterior rim.

**AXIAL SKELETON (FROM RADIOGRAPHS).**—Tips of all neural and haemal spines thin and pointed; vertebrae 3–8 with more or less depressed neural spines not much shorter than spine of 2nd vertebra; base of neural spines 5–12 enlarged; parapophyses on vertebrae 7–8 to 12 increasing in length posteriorad; pleural ribs on vertebrae 3–12 and epipleural ribs on 3–9.

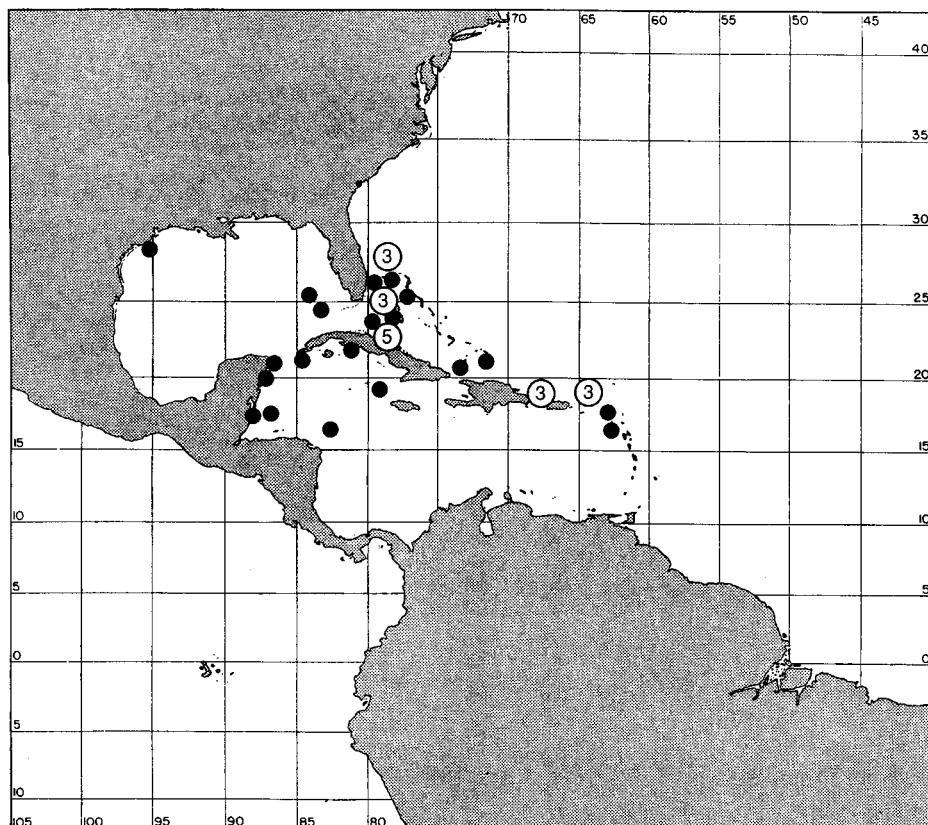


Figure 13. Records of *Neobythites unicolor* — the numbers indicate the number of neighbouring stations.

**COLORATION.**—All the 66 specimens collected in 1972 and earlier are uniformly yellowish with several minute, black spots on head and lower part of body and on the unpaired fins; eyes and peritoneum blue. A specimen caught on 31 December 1997 is dark brown caused by numerous, small spots which continue on the unpaired fins.

**Biology.**—Among 31 specimens examined 12 were unripe males, 12 unripe and 3 ripening females (SL 81–85, egg diameter 0.3 mm) and 4 with undeveloped gonads. The stomachs and intestines contained mainly unidentifiable remains of crustaceans. Caught in bottom trawls on the lower part of the continental shelf and on the upper part of the continental slope. A 105 mm SL specimen was found in a glass sponge, *Margaritella coeloptylloides*, collected at 361 m depth off Cuba by a submersible (C. R. Robins and party).

**Distribution.**—Figure 13 shows that *N. unicolor* is caught on 36 stations all over the West Indies except for the southern part of the Caribbean Sea and the main part of the Gulf of Mexico. This indistinctive species may easily turn out to have a wider distribution than that indicated by Figure 13. It is reported from depths between 183 and 937 m with a doubtful record from the northwestern Gulf of Mexico from 24 m.

Table 6. Meristic and morphometric characters of *Neobythites unicolor*.

	Holotype FMNH 69349	9 paratypes and 21 non- type specimens	Average total material
Standard length	90	33–115	
Meristic characters			
Dorsal fin	100	96–101	98.5 [28]
Caudal fin	8	8	8.0 [27]
Anal fin	85	80–86	83.0 [29]
Pectoral fin	27	26–30	27.4 [27]
Pseudobr. filaments	2	2–3	2.3 [30]
Precaudal vertebrae	12	12	12.0 [29]
Total vertebrae	59	56–60	58.1 [28]
Long rakers on anterior gill arch	12	12–14	12.8 [30]
Ant. dorsal ray above vertebra no.	5	5	5.0 [28]
Ant. anal ray below dorsal ray no.	20	18–20	19.2 [29]
Ant. anal ray below vertebra no.	15	14–15	14.1 [28]
Morphometric characters in % of SL			
Head length	22.5	21.5–24.0	22.5 [26]
Depth at anus	18.0	16.0–18.5	17.2 [27]
Upper jaw	11.5	10.5–13.0	11.9 [27]
Hor. eye window	5.1	4.5–7.5	5.3 [26]
Preanal	36.0	35.0–43.0	40.0 [27]
Predorsal	25.5	22.5–27.5	24.6 [27]
Base of ventral fin to anal fin origin	24.0	20.5–25.5	23.0 [25]
Length of ventral fin	19.0	16.0–23.0	19.7 [27]
In % of head-length			
Longest gill filaments on ant. arch	5.4	4.8–7.9	6.6 [25]

*Neobythites marginatus* Goode and Bean, 1886

(Figures 14–17)

*Neobythites marginatus* Goode and Bean, 1886:162 (type locality off Barbados).*Neobythites marginatus*: This very distinct species is mentioned in several papers dealing with fishes from the West Indies.

**Material examined.**—(134 specimens, 51–216 mm SL): HOLOTYPE: ♀, SL 102, off Barbados, 13°00.5'N, 59°36.2'W, RV BLAKE Sta. 274, 382 m, 5 Mar. 1879, MCZ 27953. NON-TYPE MATERIAL: 1 ♀, SL 84, Caribbean Sea, 17°22.6'N, 62°54.2'W, RV BLAKE Sta. 146, 448 m, 14 Jan. 1879, MCZ 28157. — 1, SL 50, Caribbean Sea, 17°16.4'N, 62°43.8'W, RV BLAKE Sta. 149, 112 m, 15 Jan. 1879, MCZ 28170. — 1 ♀, SL 156, same data as for holotype, MCZ 28154. — 1 ♀, SL 95, off Barbados, RV BLAKE Sta. 291, 366 m, 1879, MCZ 28155. — 1 ♀, SL 112, Caribbean Sea, 14°43.8'N, 61°11.4'W, RV BLAKE Sta. 193, 309 m, 5 Feb. 1879, MCZ 28156. — 1, SL 131, off Puerto Rico, 18°32'N, 66°21.3'W, RV CAROLINE Sta. 23, 476 m, 4 Feb. 1933, USNM 108428. — ♀ and ♂, SL 128+–183, off Cuba, 23°23'N, 79°17'W, RV ATLANTIS Sta. 2985, 458 m, 12 Mar. 1938, MCZ 39339. — 1, SL 51, off Cuba, 23°22'N, 79°56'W, RV ATLANTIS Sta. 2987A, 522 m, 13 Mar. 1938, MCZ 39318. — 2 ♀, SL 112–133, off Cuba, 23°5.5'N, 79°40'W, RV ATLANTIS Sta. 3439, 540 m, 2 May 1939, MCZ 38734. — 1 ♀, SL 98, off Cuba, 23°22'N, 79°53'W, RV ATLANTIS Sta. 3445, 604 m, 3 May 1939, MCZ 39252. — 1, SL 117, off Dry Tortugas, 24°28'N, 83°30'W, RV OREGON Sta. 1539, 403 m, 16 Jun. 1956, UF 201269. — 1, SL 126, off Honduras, 16°42'N, 82°33'W, RV OREGON Sta. 1947, 549 m, 17 Sep. 1957, UF 202332. — 1, SL 92, Caribbean Sea, 17°37'N, 63°36'W, RV OREGON Sta. 2636,

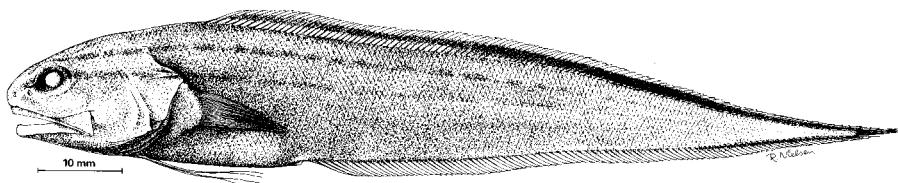


Figure 14. *Neobythites marginatus*. Holotype, MCZ 27953, SL 102.

512 m, 30 Sep. 1959, USNM 340902. — 3, SL 120–135+, off Puerto Rico, 18°18'N, 67°18.5'W, RV OREGON Sta. 2652, 549 m, 6 Oct. 1959, UF 206996. — 1 ♀, SL 140, 11°36'N, 62°46'W, RV OREGON Sta. 2777, 531 m, 19 Apr. 1960, MCZ 57919. — 2, SL 118–121, off Bahamas, 27°20'N, 78°19'W, RV SILVER BAY Sta. 3472, 458–622 m, 25 Oct. 1961, USNM 309276. — 3 ♀ and 2?, SL 95–190, off Cuba, 23°30'N, 79°27'W, RV SILVER BAY Sta. 3514, 549 m, 8 Nov. 1961, ZMUC P771192-94 (3 ♀, SL 95–190) and USNM 308901 (2, SL 100–161). — 1, SL 150, Caribbean Sea, 16°35'N, 80°10'W, RV OREGON Sta. 3560, 576 m, 18 May 1962, USNM 340912. — 10, SL 82–140, Caribbean Sea, 14°10'N, 81°55'W, RV OREGON Sta. 3565, 439–458 m, 21 May 1962, USNM 309272. — 2, SL 125–135, Caribbean Sea, 14°8'N, 81°55'W, RV OREGON Sta. 3570, 366–439 m, 21 May 1962, USNM 340899. — 1, SL 158, Caribbean Sea, 9°15'N, 81°32'W, RV OREGON Sta. 3582, 458 m, 25 May 1962, USNM 340911. — 1, SL 147, Caribbean Sea, 9°00'N, 81°23'W, RV OREGON Sta. 3599, 458 m, 31 May 1962, USNM 340914. — 13, SL 94–159, off Nicaragua, 14°23'N, 81°45'W, RV OREGON Sta. 3616, 458 m, 5 Jun 1962, UF 211506. — 1 ♀, SL 113, off North Carolina, 36°11'N, 74°52'W, RV SILVER BAY Sta. 4136, 73 m, 8 Jun. 1962, UF 212327. — 5, SL 87–112, Caribbean Sea, 16°44'N, 87°55'W, RV OREGON Sta. 3634, 348 m, 9 Jun. 1962, USNM 309264. — 1, SL 142, Gulf of Mexico, 29°9'N, 88°11.5'W, RV OREGON Sta. 3684, 412–458 m, 8 Aug. 1962, USNM 340901 — 1, SL 133, Gulf of Mexico, 28°54'N, 88°49.5'W, RV OREGON Sta. 4037, 339–348 m, 2 Nov. 1962, USNM 309259. — 1, SL 132, Caribbean Sea, 24°29'N, 83°28'W, RV OREGON Sta. 4138, 348 m, 9 Dec. 1962, USNM 309260. — 1, SL 123, off Dry Tortugas, 24°18'N, 83°18'W, RV OREGON Sta. 4338, 384 m, 26 Jul. 1963, UF 213315. — 4 ♀, SL 122–158, off Dry Tortugas, 24°32'N, 83°37'W, RV OREGON Sta. 4341, 393 m, 27 Jul. 1963, ZMUC P77568-569 (2, SL 136–153) and USNM 309257 (2, SL 122–158). — 4, SL 132–150, off Dry Tortugas, 24°33'N, 83°38'W, RV OREGON Sta. 4343, 384 m, 27 Jul. 1963, UF 212495. — 4 ♀, 1 ♂ and 5?, SL 115–170, off Dry Tortugas, 24°31'N, 83°34'W, RV OREGON Sta. 4348, 384 m, 29 Jul. 1963, ZMUC P771195-1199 (5, SL 127–158) and USNM 308898 (5, SL 115–170). — 1, SL 142, Gulf of Mexico, 24°33'N, 83°38'W, RV OREGON Sta. 4356, 393 m, 30 Jul. 1963, USNM 340900. — 1, SL 180, off Dry Tortugas, 24°30'N, 83°33'W, RV OREGON Sta. 4362, 348 m, 1 Aug. 1963, UF 213276. — 1, SL 165, off Dry Tortugas, 24°28'N, 83°26'W, RV OREGON Sta. 4368, 384 m, 5 Aug. 1963, UF 213671. — 1, SL 159, Caribbean Sea, 11°49'N, 69°24'W, RV OREGON Sta. 4412, 549 m, 3 Oct. 1963, USNM 309258. — 1, SL 160, Caribbean Sea, 11°10'N, 68°8'W, RV OREGON Sta. 4439, 421 m, 9 Oct. 1963, USNM 340913. — 3, SL 120–154, Gulf of Mexico, 24°29'N, 83°33'W, RV OREGON Sta. 4523, 366 m, 22 Nov. 1963, USNM 340910. — 3, SL 88–143, Gulf of Mexico, 24°28'N, 83°27'W, RV OREGON Sta. 4544, 384 m, 26 Nov. 1963, USNM 340909. — 7, SL 112–150, Gulf of Mexico, 24°30'N, 83°34'W, RV OREGON Sta. 4545, 393 m, 26 Nov. 1963, USNM 309266. — 2, SL 145–210, Caribbean Sea, 15°30'N, 63°38'W, RV OREGON Sta. 4994, 366–375 m, 8 Sep. 1964, USNM 309271. — 1 ♂, SL 88, off Tobago, 11°30'N, 60°46'W, RV OREGON Sta. 5028, 366–439 m, 22 Sep. 1964, USNM 309244. — 1, SL 165, Caribbean Sea, 11°36.5'N, 62°46.5'W, RV OREGON Sta. 5037, 366–439 m, 24 Sep. 1964, USNM 309261. — 1 ♀, SL 216, off Cuba, 20°42'N, 73°38'W, RV OREGON Sta. 5417, 659 m, 24 May 1965, USNM 309005. — 1 ♀ and 1 ♂, SL 146–151, off Panama, 9°47'N, 79°25'W, RV OREGON Sta. 6740, 421 m, 19 Oct. 1965, USNM 309007. — 1 ♀, SL 102, Florida Key West, 24°16'N, 82°30'W, RV OREGON Sta. 5795, 439 m, 27 Nov. 1965, USNM 309003. — 3, SL 119–138, Caribbean Sea,

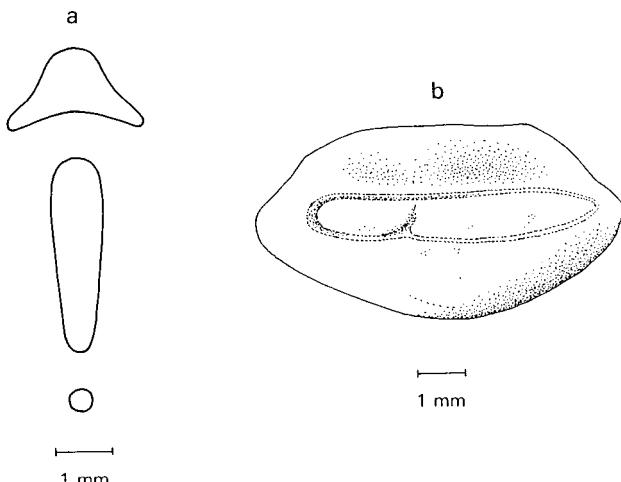


Figure 15. *Neobythites marginatus*. a) Vomer and basibranchial tooth patches of holotype; b) Left sagitta of USNM 308898, SL 150.

15°38'N, 61°15'W, RV OREGON Sta. 5925, 448 m, 4 Mar. 1966, USNM 309263. — 2 ♀ and 1 ♂, SL 112–125, off Dominica, 15°36'N, 61°19'W, RV OREGON Sta. 5926, 503 m, 4 Mar. 1966, USNM 340894. — 12, SL 97–172, off Colombia, west of Islas San Bernardo, RV PILLSBURY Sta. 374, 683–794 m, 14 July 1966, UF 222961. — 1, SL 145, off Mexico, 21°2'N, 86°24'W, RV PILLSBURY Sta. 584, 641 m, 23 May 1967, UF 230426. — 1, SL 143, off Colombia, 12°13.3'N, 72°50'W, RV PILLSBURY Sta. 776, 406–576 m, 29 Jul. 1968, UF 230447. — 1, SL 156, Caribbean Sea, 13°58'N, 81°53'W, RV OREGON II Sta. 10199, 403 m, 20 Nov. 1968, USNM 309267. — 2, SL 110+–158, Caribbean



Figure 16. *Neobythites marginatus* trying to avoid a submersible at a depth of 610 meters off Puerto Rico (Dannie Hensley foto).

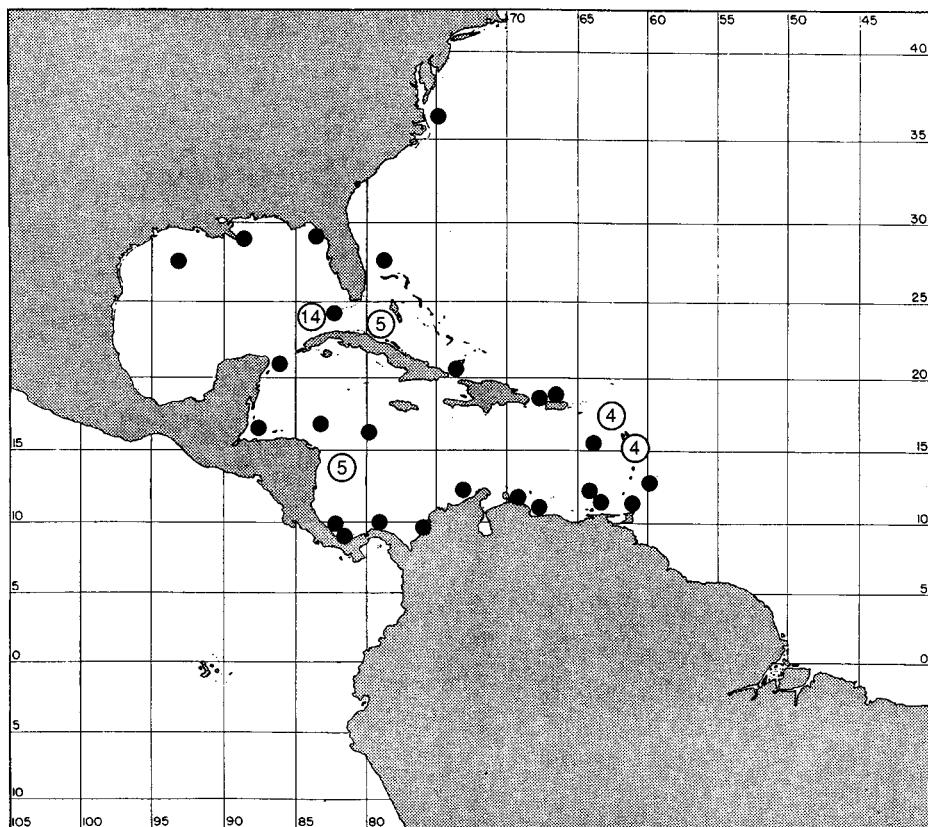


Figure 17. Records of *Neobythites marginatus* — the numbers indicate the number of neighbouring stations.

Sea, 13°37'N, 81°53'W, RV OREGON II Sta. 10200, 458 m, 21 Nov. 1968, USNM 309256 and 309270. —1, SL 154, off Guadeloupe, 16°5'N, 61°24'W, RV PILLSBURY Sta. 923, 476–686 m, 14 Jul. 1969, UF 230280. —2, SL 122–137, Caribbean Sea, 17°6'N, 62°17'W, RV OREGON II Sta. 10843, 589 m, 8 Dec. 1969, USNM 309265. —2 ♀, SL 143–151, off Colombia, 10°00'N, 76°10'W, RV OREGON II Sta. 11244, 549 m, 6 Nov. 1970, UF 101601 (1, SL 151) and ZMUC P771200 (1, SL 143). —1 ♀, SL 150, Gulf of Mexico, 27°35.8'N, 93°1'W, Cr. 71A7-56, 538 m, 24 July 1971, TCWC 6320.2. —♀, SL 140, Florida Strait, 24°16'N, 82°16.5'W, Field No. GHB92-15, 898–933 m, 25 Sep. 1992, UF 98434. —♂, SL 146, Florida Keys, 24°43.2'N, 83°55'W, Field No. FFS97-13, 30 Apr. 1997, UF 103665.

*Remarks to material.*—In all, 134 specimens are referred to *N. marginatus* of which 38 (SL underlined in "Material examined") were examined in detail and form the basis of Tables 1 and 7.

*Diagnosis.*—*N. marginatus* differs from all other Atlantic *Neobythites* spp. by the prominent, dark, horizontal band on the dorsal fin and more indistinct horizontal, brown lines on the body and by the following combination of characters: two, sharp spines on preoperculum, dorsal finrays 103–113, anal finrays 89–97, total vertebrae 61–66 and length of ventral fins 12.0–16.5 % SL.

*Similarity.*—Compared to the other Atlantic species of *Neobythites* with two preopercular spines, *N. marginatus* seems closest to *N. brasiliensis* judging from the meristic charac-

Table 7. Meristic and morphometric characters of *Neobythites marginatus*.

	Holotype MCZ 27953	37 non- type specimens	Average of total material
Standard length	102	51–190	
Meristic characters			
Dorsal fin	107	103–113	108.6 [31]
Caudal fin	8	8	8.0 [29]
Anal fin	93	89–97	94.1 [31]
Pectoral fin	27	24–28	26.1 [29]
Pseudobr. filaments	3	2–4	3.1 [34]
Precaudal vertebrae	12	12–13	12.2 [37]
Total vertebrae	63	61–66	63.5 [30]
Long rakers on anterior gill arch	11/12	11–14	12.2 [36]
Ant. dorsal ray above vertebra no.	6	5–6	5.6 [36]
Ant. anal ray below dorsal ray no.	17	17–20	18.2 [35]
Ant. anal ray below vertebra no.	14	14–15	14.4 [35]
Morphometric characters in % of SL			
Head length	21.0	20.0–22.5	21.1 [33]
Depth at anus	15.0	13.0–16.5	14.8 [33]
Upper jaw	10.0	9.4–11.5	10.6 [31]
Hor. eye window	4.5	4.1–5.9	4.7 [31]
Preanal	37.0	35.0–43.0	38.8 [30]
Predorsal	25.5	22.5–26.0	24.3 [31]
Base of ventral fin to anal fin origin	22.0	21.5–26.0	23.3 [30]
Length of ventral fin	12.5	12.0–16.5	13.7 [28]
In % of head-length			
Longest gill filaments on ant. arch	5.6	5.6–8.2	6.9 [32]

ters. The two species differ from each other by the lower number of precaudal vertebrae in *marginatus* (12(13) vs 14) and by a different pattern of pigmentation (Figs. 14, 21).

**Description.**—The principal meristic and morphometric characters are given in Tables 1 and 7.

Snout pointed, equal in length to eye window. Maxilla ends well behind eye. Teeth small and granular except for larger teeth on the subtriangular vomer; anterior basibranchial tooth patch long and narrow, posterior small and circular (Fig. 15A). Anterior nostril in small specimens with a skin-flap, in larger specimens a simple hole like the posterior nostril. Mandibular canal with four pores, the anterior close to lower jaw symphysis. No papillae or fringes on snout and lower lip. Hind margin of preoperculum with two strong spines, broader in smaller specimens. Opercular spine strong and straight. Head and body with small, cycloid scales. Lateral line indistinct. Ventral fins reach 2/3 to anal fin. Anterior gill arch with 2–4 small knobs and 2–4 long rakers on upper branch, one long raker in angle and lower branch with 8–9 long rakers and 3–7 very short knobs.

Sagittal otolith (Fig. 15B) oval and rather thick with an even rim; sulcus distinct with partly fused cauda and ostium; the latter about twice as long as the former; no ostial channel.

**AXIAL SKELETON (FROM RADIOGRAPHS).**—Tips of all neural and haemal spines thin and pointed; vertebrae 3–8 with depressed neural spines in some specimens shorter and in others equal in length to spine of 2nd vertebra; base of neural spines 3–11 enlarged;

parapophyses on the posterior 6–7 vertebrae increasing in length posteriorad; pleural ribs on posterior 10–11 precaudal vertebrae and epipleural ribs on nos. 3–10.

**COLORATION.**—Figure 14 shows a recent illustration of the holotype caught in 1879 showing the distinct dark stripe on the dorsal fin and the indication of horizontal brownish lines starting on the snout and running to the posterior part of the body. Especially the ventral part of the body and head with numerous, minute, dark pigment spots. The eyes, lips and a ring around anus have more dense pigmentation. A specimen caught in 1997 shows almost the same coloration except for being dark brown where the holotype is light brown. Mouth- and branchial cavities dark brown.

**Biology.**—Lives on or near the bottom on the continental shelf and on the upper slope. Figure 16 shows a specimen trying to escape a Johnson Sea-Link II by diving head first into the bottom at a depth of 610 m. None of seven males and just one (SL 153) of the 28 females were ripe with an egg diameter of 0.5–1 mm. The stomachs and intestines contained unidentifiable remains of crustaceans.

**Distribution.**—Figure 17 shows that *N. marginatus* was found at 57 stations from off North Carolina to Trinidad and in both the Caribbean Sea and in the Gulf of Mexico at depths between 73 and 933 m. It is the widest distributed of the West Atlantic *Neobythites* spp.

*Neobythites elongatus* Nielsen and Retzer, 1994  
(Figs. 18–20)

*Neobythites elongatus* Nielsen and Retzer, 1994: 993, fig. 2b (type locality 18°19'N, 67°17.5'W).

**Material examined.**—(46 specimens, 59–137 mm SL): HOLOTYPE: ♂, SL 133, Caribbean Sea, 18°19'N, 67°17.5'W, RV OREGON Sta. 2652, trawl, 549 m, 6 Oct. 1959, FMNH 69355. — PARATYPES: 2 ♂ and 1 ♀, SL 117–125, Caribbean Sea, 16°41'N, 81°2'W, RV OREGON Sta. 1888, trawl, 458 m, 23 Aug. 1957, FMNH 69339 (2, SL 117–125) and ZMUC P77941 (1, SL 121). — ♂, SL 109, Caribbean Sea, 18°16.5'N, 67°17'W, RV OREGON Sta. 2650, trawl, 229 m, 6 Oct. 1959, FMNH 69347. — 3 ♀, SL 93–135, same locality data as for holotype, FMNH 104424. NON-TYPE MATERIAL: 2, SL 80–82, north of Puerto Rico, 18°32'N, 66°21.3'W, RV CAROLINE Sta. 23, 476 m, 4 Feb. 1933, USNM 108429. — 2, SL 56–118, north of Puerto Rico, 18°37.3'N, 65°3'W, RV CAROLINE Sta. 96, 549 m, 3 Mar. 1933, USNM 108426 and 108427. — 1 ♂ and 1 ♀, SL 108–109, off Cuba, 22°47'N, 78°49'W, RV ATLANTIS Sta. 2981C, 357 m, 10 Mar. 1938, MCZ 39315. — 1, SL 93, off Cuba, 23°11'N, 79°8'W, RV ATLANTIS Sta. 2983A, 430 m, 12 Mar. 1938, MCZ 39301. — 2 ♀, SL 115–116, off Cuba, 23°5'N, 79°28'W, RV ATLANTIS Sta. 3436, 467 m, 2 May 1939, MCZ 101616. — 1, SL 102, off Dry Tortugas, 24°28'N, 83°29'W, RV OREGON Sta. 1550, 388 m, 18 June 1956, UF 203896. — 1, SL 97, off Florida, 27°39'N, 79°15'W, RV SILVER BAY Sta. 441, 503–549 m, 9 June 1958, UF 203817. — 1, SL 103, 17°36'N, 63°32'W, RV OREGON Sta. 2636, 439–476 m, 30 Sep. 1959, USNM 340904. — 1, SL 55, 17°40'N, 63°46'W, RV OREGON Sta. 2639, 659–824 m, 30 Sep. 1959, USNM 309255. — 1, SL 119, off Puerto Rico, 18°16.5'N, 67°17'W, RV OREGON Sta. 2650, 458 m, 6 Oct. 1959, UF 207001. — 1, SL 100, off Honduras, 16°40'N, 82°51.6'W, RV EXPLORER Sta. 1C, dredge, 366–670 m, 11 Mar. 1960, USNM 326146. — 1, SL 128, 23°40'N, 79°18'W, RV SILVER BAY Sta. 2458, 531 m, 5 Nov. 1960, USNM 309262. — 2, SL 78–116, 23°59'N, 79°17.5'W, RV SILVER BAY Sta. 2469, 531–549 m, 6 Nov. 1960, USNM 309274. — 1, SL 123, 24°48'N, 79°17'W, RV SILVER BAY Sta. 2475, 549 m, 8 Nov. 1960, USNM 309273. — 1, SL 137, off Panama, 9°3'N, 81°22'W, RV OREGON Sta. 3598, 366–403 m, 31 May 1962, USNM 340905. — 1, SL 93, off Grand Bahama Is., 27°41'N, 79°11'W, RV GERDA Sta. 179, 549–567 m, 1 July 1963, UF 214296. — 2, SL 47–63, off Biscayne, 25°42'N, 79°23'W, RV GERDA Sta. 234, 452–474 m, 30 Jan. 1964, UF 213834. — 1, SL 60, off Grand Bahama Is., 26°57'N, 79°12.5'W, RV GERDA Sta. 246, 512 m, 5 Feb. 1964.

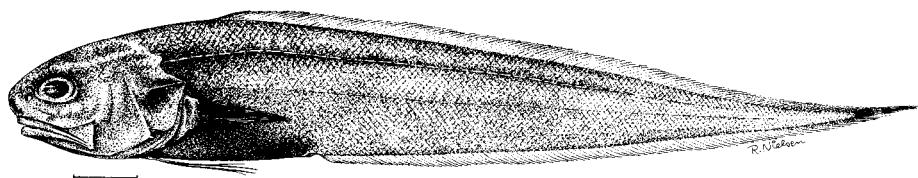


Figure 18. *Neobythites elongatus*. Holotype, FMNH 69355, SL 133.

UF 213853. — 2, SL 59–62, off Grand Bahama Is., 27°29.5'N, 78°37.5'W, RV GERDA Sta. 252, 485–496 m, 5 Feb. 1964, UF 213858. — 1, SL 100, off Grand Bahama Is., 27°37'N, 78°56'W, RV GERDA Sta. 256, 855–937 m, 6 Feb. 1964, UF 213838. — 3, SL 80–103, off Grand Bahama Is., 26°28'N, 78°40'W, RV GERDA Sta. 694, 1138–1272 m, 21 July 1964, UF 227435. — 2, SL 99–123, off Grand Bahama Is., 26°27'N, 78°46'W, RV GERDA Sta. 708, 1190 m, 22 July 1965, UF 220905. — 1, SL 110, off Grand Bahama Is., 26°26'N, 78°39'W, RV GERDA Sta. 709, 723 m, 22 July 1965, UF 220908. — 2, SL 104–120, off Leeward Is., 17°41'N, 62°50.5'W, RV OREGON Sta. 6695, 549–586 m, 18 May 1967, USNM 340906. — 1, SL 130, off Belize, 16°35'N, 87°56'W, TABL Sta. 67-174, 275–320 m, 19 May 1967, UF 101542. — 1, SL 95, off Anguilla Is., 18°26.4'N, 63°12.6'W, RV PILLSBURY Sta. 984, 719–825 m, 22 July 1969, UF 233939. — 1, SL 134, off Cuba, 23°25'N, 79°40'W, RV OREGON II Sta. 10862, 458 m, 16 Dec. 1969, USNM 309275. — 3 ♀, SL 115–134, off Anguilla Is., 23°35'N, 79°24'W, RV PILLSBURY Sta. 1171, 516 m, 27 June 1970, UF 230456 (2, SL 115–134) and ZMUC P771188 (1, SL 116).

*Remarks to material.*—In all, 46 specimens are referred to *N. elongatus* of which 17 (SL underlined in "Material examined") were examined in detail and form the basis of Tables 1 and 8.

*Diagnosis.*—*N. elongatus* differs from the other Atlantic *Neobythites* spp. by having a faint, marbled, brownish pigmentation on dorsal part of body but lacking distinct ocelli and bands and by the following combination of characters: 2 strong spines on hind margin of preopercle, dorsal finrays 101–105, anal finrays 86–90, pectoral finrays 23–26, total vertebrae 60–63 and relatively short ventral fin (12–14% SL).

*Similarity.*—The only other Atlantic *Neobythites* species without ocelli or darks bands are *multidigitatus* and *unicolor*; *elongatus* differs from the former by having 23–26 pec-

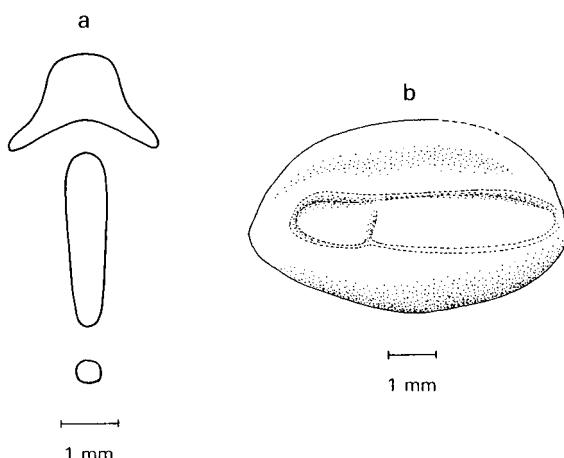


Figure 19. *Neobythites elongatus*. a) Vomer and basibranchial tooth patches of holotype; b) Left sagitta of holotype.

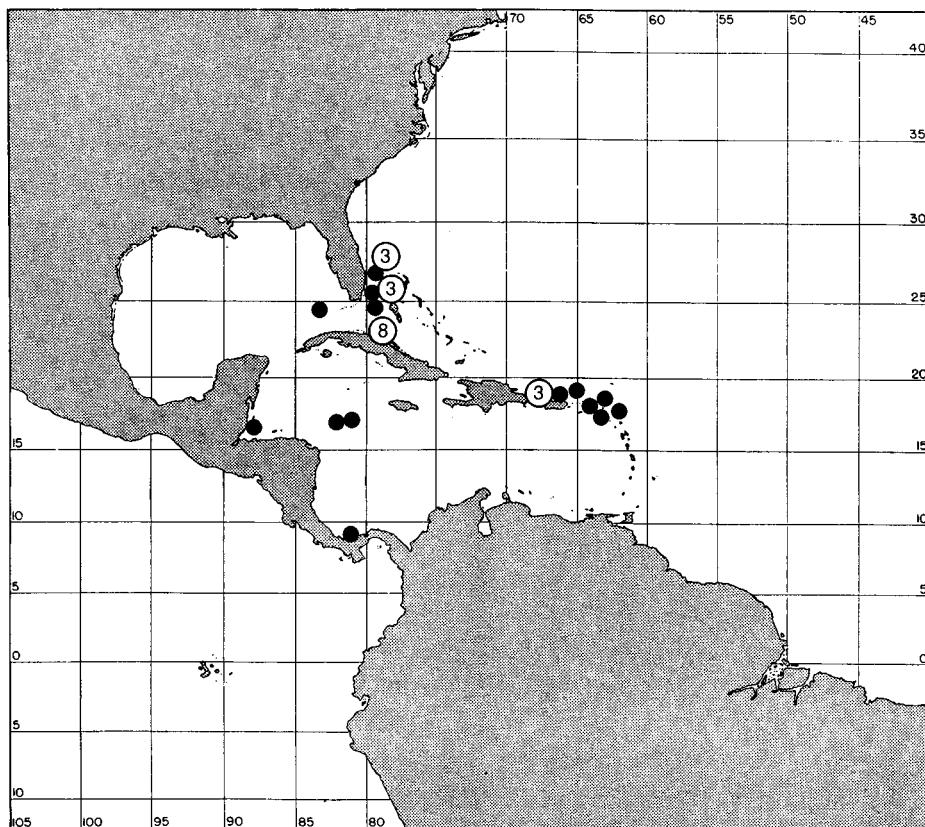


Figure 20. Records of *Neobythites elongatus* — the numbers indicate the number of neighbouring stations.

toral finrays vs 32, and from the latter by having two strong, preopercular spines vs one spine. Three additional species, *braziliensis*, *marginatus* and *multidigitalis*, have two preopercular spines; judging from the meristics (Table 1) and the form of the vomer (Figs. 19A, 15A) *elongatus* is closest to *marginatus*.

*Description.*—The principal meristic and morphometric characters are given in Tables 1 and 8.

Snout blunt, shorter than eye window. Maxilla ends behind eye. Teeth small and granular on jaws and palatines; subtriangular vomer with stronger teeth; anterior basibranchial tooth patch long and narrow, posterior small and circular (Fig. 19A). Anterior nostril with a small tube, posterior larger without a tube. Mandibular canal with four pores on each side, the anterior close to lower jaw symphysis. No papillae on lower lip or fringes on snout. Preopercle with two sharp spines, opercle with one straight, sharp spine. Small, cycloid scales on head and body. Ventral fins reach two thirds to anal fin. Anterior gill arch with 2–4 short and 3–4 long rakers on upper branch, one long raker in angle and lower branch with 9–11 long and 3–6 short rakers.

Sagittal otolith (Fig. 19B) oval and rather thin with a finely undulated rim; sulcus broad and rather shallow with a ostial connection to anterior rim; ostium twice as long as cauda, not completely separateed; distance from posterior rim to cauda half the length of cauda.

Table 8. Meristic and morphometric characters of *Neobythites elongatus*.

	Holotype FMNH 69355	7 paratypes and non-type specimens	Average of total material
Standard length	133	60–135	
Meristic characters			
Dorsal fin	103	101–105	102.6 [17]
Caudal fin	8	7–8	7.9 [17]
Anal fin	90	86–90	88.5 [17]
Pectoral fin	23	23–26	24.3 [17]
Pseudobr. filaments	4	2–4	3.6 [16]
Precaudal vertebrae	12	12	12.0 [17]
Total vertebrae	60	60–63	60.8 [17]
Long rakers on anterior gill arch	14	13–15	13.6 [16]
Ant. dorsal ray above vertebra no.	5	5–6	5.4 [16]
Ant. anal ray below dorsal ray no.	17	16–19	17.5 [17]
Ant. anal ray below vertebra no.	14	14	14.0 [16]
Morphometric characters in % of SL			
Head length	22.0	20.5–23.0	21.6 [17]
Depth at anus	15.5	13.5–17.5	15.4 [17]
Upper jaw	11.0	10.5–12.0	11.2 [17]
Hor. eye window	4.7	4.7–5.7	5.1 [16]
Preanal	37.5	37.0–42.0	39.4 [17]
Predorsal	25.0	23.0–28.0	25.0 [17]
Base of ventral fin to anal fin origin	22.0	20.5–27.0	23.6 [17]
Length of ventral fin	14.0	12.0–14.0	13.3 [17]
In % of head-length			
Longest gill filaments on ant. arch	4.9	6.0–9.0	7.5 [16]

AXIAL SKELETON (FROM RADIOGRAPHS).—Tips of neural and haemal spines thin and pointed; vertebrae 3–8 with slightly depressed neural spines not much shorter than spine of 2nd vertebra; base of neural spines 4–12 enlarged; parapophyses on vertebrae 7–12 increasing in length posteriorad; pleural ribs on vertebrae 4–11 and epipleural ribs on 4–9.

COLORATION.—Dorsum of head and body indistinctly, brownish marbled; small, black spots especially on ventral part of head and on abdomen; branchial cavity with brown lining; peritoneum dark.

Biology.—None of the 17 detailed examined specimens (6 males, 10 females and 1?) was ripe. The stomachs and intestines contained small gastropods and unidentifiable remains of crustaceans.

Distribution.—Figure 20 shows that *N. elongatus* was caught on 31 stations from Florida Strait to off Panama but with just a few in the Caribbean Sea and in the Gulf of Mexico. Considering the wide depth distribution (229–1272 m) and the lack of distinct color markings additional sampling and re-examination of collections undoubtedly will lead to more material of *elongatus*.

***Neobythites brasiliensis* new species**  
 (Figs. 10,21–22)

*Material examined*.—(7 specimens, 91–146 mm): HOLOTYPE: ♀, SL 91, off Brazil, 1°49'N, 46°48'W, RV OREGON Sta. 2083, 412 m, 17 Nov. 1957, USNM 185111. PARATYPES: ♂, SL 109, off Brazil, 2°41'N, 47°48'W, RV OREGON Sta. 2067, 329 m, 15 Nov. 1957, USNM 308990. — ♂, SL 111, off Brazil, 1°51'N, 46°50'W, RV OREGON Sta. 2082, 366 m, 17 Nov. 1957, USNM 308991. — 4 ♀, SL 118–146, off Brazil, 1°52'N, 46°54'W, RV OREGON Sta. 2081, 320 m, 17 Nov. 1957, UF 204180 (3, SL 118–146) and ZMUC P771179(1, SL 138).

*Diagnosis*.—*N. brasiliensis* differs from all other Atlantic *Neobythites* spp. by the presence of 5–7 diffuse, vertical, dark bars which continue as ocelli or dark blotches on the dorsal and anal fins, ventral fin length 9.5–11.5% SL, the shape of vomer (Fig. 22B), many, minute papillae on lower lip and by the following combination of characters: dorsal finrays 112–116, anal finrays 95–98, total vertebrae 63–66, preopercular spines two.

*Similarity*.—Compared to the other Atlantic species of *Neobythites* with two sharp preopercular spines *N. brasiliensis* seems closest to *N. marginatus* (see comparison p. xx).

*Description*.—The principal meristic and morphometric characters are given in Table 1 and 9.

HOLOTYPE: Snout blunt, equal in length to eye window. Maxilla ends just behind eye. Teeth close-set and needleform in jaws; teeth not as close and larger in palatines and in triangular vomer; anterior basibranchial tooth patch long and rather narrow, posterior small and circular (Fig. 22A). Anterior nostril ends in a tube, posterior with a low rim. Mandibular canal with four pores on each side, anterior close to lower jaw symphysis. Numerous, small papillae on lower lip; 2–3 distinct fringes on each side of tip of snout. Hind margin of preopercle with two strong, pointed spines. Spine on operculum strong and straight. Head and body with small, cycloid scales, most of which are lost. Lateral line indistinct. Ventral fins reach halfway to anal fin. Anterior gill arch with two small knobs and three long rakers on upper branch, one long in the angle and lower branch with nine long rakers and 4–5 small knobs.

Sagittal otolith (Fig. 22C) elongate and rather thin with a straight dorsal rim; sulcus distinct with well separated ostium and cauda; ostium twice as long as cauda; ostial channel present; distance from posterior rim to cauda equal to length of cauda.

AXIAL SKELETON (FROM RADIOGRAPHS).—Tips of all neural and haemal spines thin and pointed; vertebrae 3–7 with depressed neural spines all considerably shorter than the spine of vertebra no. 2; base of neural spines 4–11 enlarged; parapophyses on vertebrae

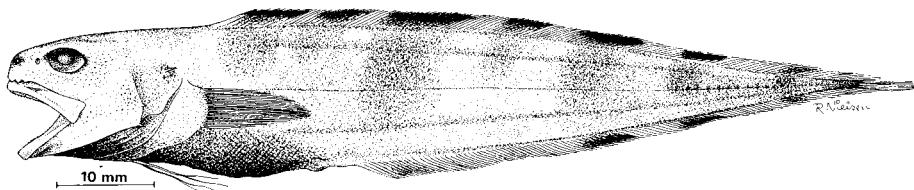


Figure 21. *Neobythites brasiliensis*. Holotype, USNM 185111, SL 91.

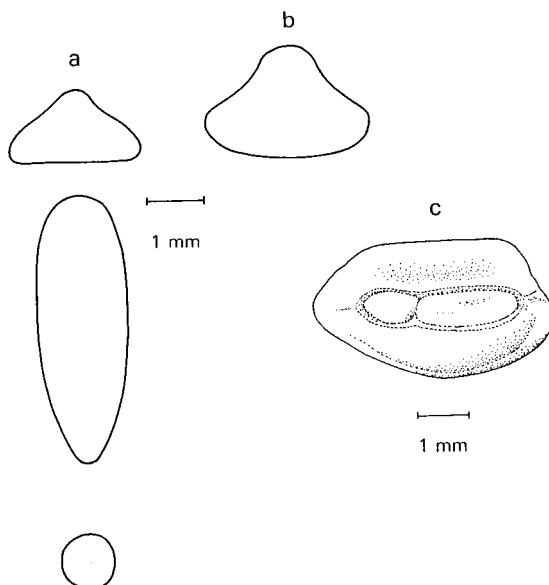


Figure 22. *Neobythites brasiliensis*. a) Vomer and basibranchial tooth \ patches of holotype; b) Vomer of paratype, UF 204180, SL 146; c) Left sagitta of paratype, USNM 308991, SL 111.

7–14 increasing in length posteriorad; pleural ribs on vertebrae 3–14 and epipleural ribs on 3–12.

Coloration (after 40 years of preservation): Body with seven faint, broad, brown, vertical bands which continue onto dorsal and anal fins as ocelli or dark blotches; peritoneum dark brown; brown ring around eyes; many, small, scattered, black spots on head and body.

**PARATYPES:** The six paratypes differ very little from the holotype. The anterior gill arch has 2–3 small knobs on the upper branch and 3–5 on the lower. The vomer tends to become more diamond-shaped with growth (Fig. 22B).

**Biology.**—The stomachs and intestines contain unidentifiable remains of crustaceans. None of the five females or two males was ripe.

**Distribution.**—Caught at four stations off the mouth of the Amazon River on the upper part of the slope at 320–412 m of depth (Fig. 10). Since *N. brasiliensis* has a very characteristic color pattern it is unlikely that specimens have been misidentified so this restricted distribution seems real.

**Etymology.**—The specific name refers to Brazil, off which the type was caught.

Table 9. Meristic and morphometric characters of *Neobythites braziliensis* and *N. multidigitatus*.

	<i>N. braziliensis</i> Holotype USNM 185111	Paratypes 6 specimens	Average of HT and PTs	<i>N. multidigitatus</i> Holotype UF 214853
Standard length	91	109–146		79
Meristic characters				
Dorsal fin	114	112–116	113.6	110
Caudal fin	8	8	8	8
Anal fin	96	95–98	96.7	91
Pectoral fin	29	28–29	28.6	32
Pseudobr. filaments	2–3	2–4	2.7	3
Precaudal vertebrae	14	14	14	15
Total vertebrae	66	63–66	64.9	65
Long rakers on anterior gill arch	13	12–14	13.4	10
Ant. dorsal ray above vertebra no.	5	5–6	5.1	5
Ant. anal ray below dorsal ray no.	21	20–22	21	24
Ant. anal ray below vertebra no.	15	14–15	14.9	17
Morphometric characters in % of SL				
Head length	21.0	21.0–21.5	21.3	21.0
Depth at anus	16.5	16.0–17.5	16.6	13.5
Upper jaw	10.5	9.3–11.5	10.4	11.0
Hor. eye window	4.1	4.5–5.0	4.7	5.3
Preanal	39.5	39.5–43.5	41.6	36.0
Predorsal	22.0	21.5–23.0	22.6	22.0
Base of ventral fin to anal fin origin	23.0	21.0–24.0	24	20.5
Length of ventral fin	10.5	9.5–11.5	10.7	13.5
In % of head-length				
Longest gill filaments on ant. arch	5.8	5.1–7.2	6.1	10.5

***Neobythites multidigitatus* new species**  
(Fig. 23)

*Material examined*.—(1 specimen, 79 mm): HOLOTYPE: SL 79, Bahama Is., 26°12'N, 79°31'W, RV GERDA Sta. 299, 641 m, 5 Apr. 1964, UF 214853.

*Diagnosis*.—*N. multidigitatus* differs from all other Atlantic *Neobythites* spp. by the large number of pectoral finrays (32 vs 23–30) and precaudal vertebrae (15 vs 11–14), by the narrow sulcus of the sagitta (Fig. 24B), by the two broad, flat spines on the hind margin of the preopercle and by few long rakers on anterior gill arch (10 vs 11–16). Also the holotype, and only known specimen, shows no ocelli, stripes or other kinds of color markings after 33 yrs of preservation.

*Similarity*.—*N. multidigitatus* seems closest to *N. elongatus* judging from the lack of color markings and the presence of two spines on the preopercle. It differs from *elongatus* i. a. by the larger number of pectoral finrays (32 vs 23–26) and fewer long rakers on anterior gill arch (10 vs 13–15).

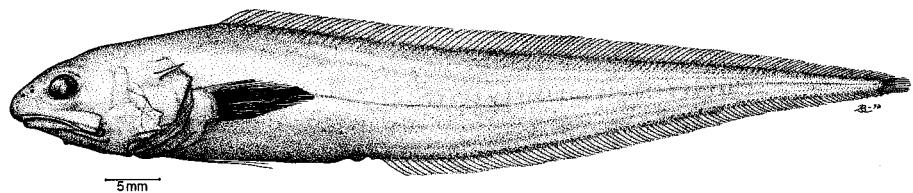


Figure 23. *Neobythites multidigitatus*. Holotype, UF 214853, SL 79.

**Description.**—The principal meristic and morphometric characters are given in Tables 1 and 9.

**HOLOTYPE:** Snout pointed, equal in length to eye window. Maxilla ends well behind eye. Teeth small and granular, somewhat larger on the subtriangular vomer (Fig. 24B); anterior basibranchial tooth patch long and narrow, posterior small and circular. A low rim surrounding each nostril. Mandibular canal with four pores on each side, the anterior close to lower jaw symphysis. No papillae or fringes on snout and lower lip. Hind margin of preopercle with two broad, flat spines. Spine on operculum strong and straight. Small scales on head and body, only a few remain. Lateral line indistinct. Pelvic fins reach halfway to anal fin. Anterior gill arch with four short and one long raker on upper branch, one long in the angle and lower branch with eight long and eight very small knobs.

Sagittal otolith (Fig. 24B) elongate and rather thin with an undulating rim; the very narrow and short sulcus is distinct with a well separated ostium and cauda; ostium four times length of cauda; no ostial channel.

**AXIAL SKELETON (FROM RADIOPHOTO).**—Tips of all neural and haemal arches thin and pointed; vertebrae 3–8 with depressed neural spines all about same length as spine of vertebra no. 2; base of neural spines 3–13 enlarged; parapophyses on vertebrae 6–15 increasing in length posteriorad, pleural ribs on vertebrae 3–13 and epipleural ribs on 3–12.

**COLORATION.**—Except for a dark brown peritoneum and blue eyes the specimen is completely unpigmented.

**Biology.**—The stomach and intestine contain unidentifiable remains of crustaceans. The gonads are hardly developed.

**Distribution.**—The only known specimen was caught at a depth of 641 m off the Bahama Is.

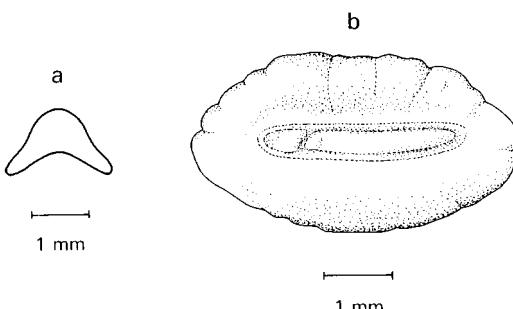


Figure 24. *Neobythites multidigitatus*. a) Vomer of holotype; b) Left sagitta of holotype.

*Etymology*.—The specific name refers to the large number of pectoral finrays.

*Remarks*.—Although the description of this new species is based solely on a single juvenile specimen which has been preserved for 33 yrs, there are enough unique meristic characters to warrant this decision. Material of this species may have been considered among juvenile specimens of other *Neobythites* spp.

#### ACKNOWLEDGMENTS

I am indebted to the following colleagues for providing information and/or material: G. Burgess, UF, K. Hartel, MCZ, Dannie Hensley, University of Puerto Rico, S. Jewett, USNM, Keiichi Matsuu, NSMT, J. McEachran, TCWC, Nigel Merrett, BMNH, David Smith, USNM. Special thanks to W. Schwarzhans for providing illustrations of the otoliths, N. Merrett and P. R. Møller for reading and commenting the manuscript and to the Carlsberg Foundation for supporting a visit to the collections in Washington, D.C. and in Gainesville.

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DATE SUBMITTED: April 18, 1998.

DATE ACCEPTED: May 18, 1998.

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